TECHNOLOGY DEPT.

Gas Journal

VOL. 278 106TH YEAR. LONDON, APRIL 28, 1954. NO. 4743. PRICE 1/3

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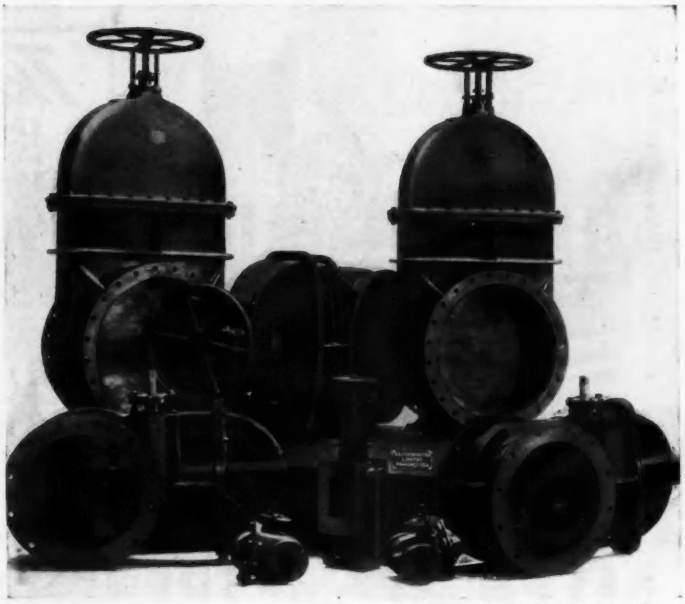

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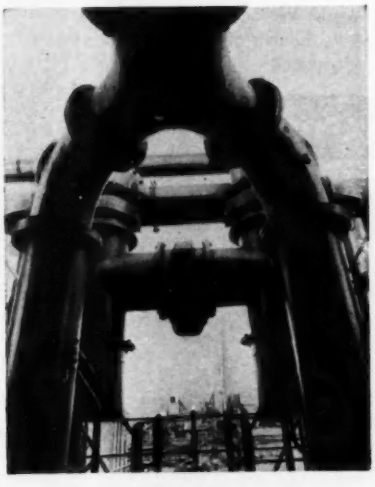

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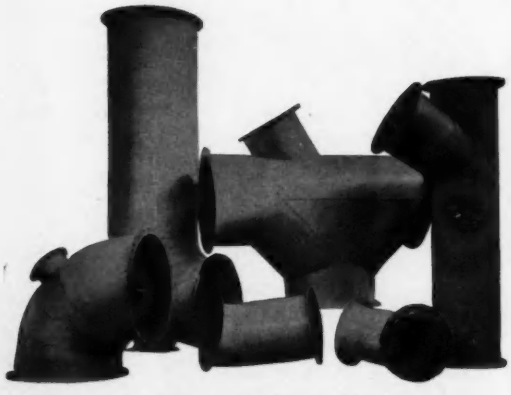

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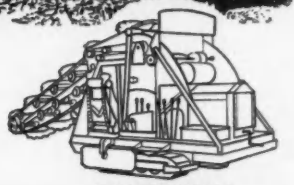

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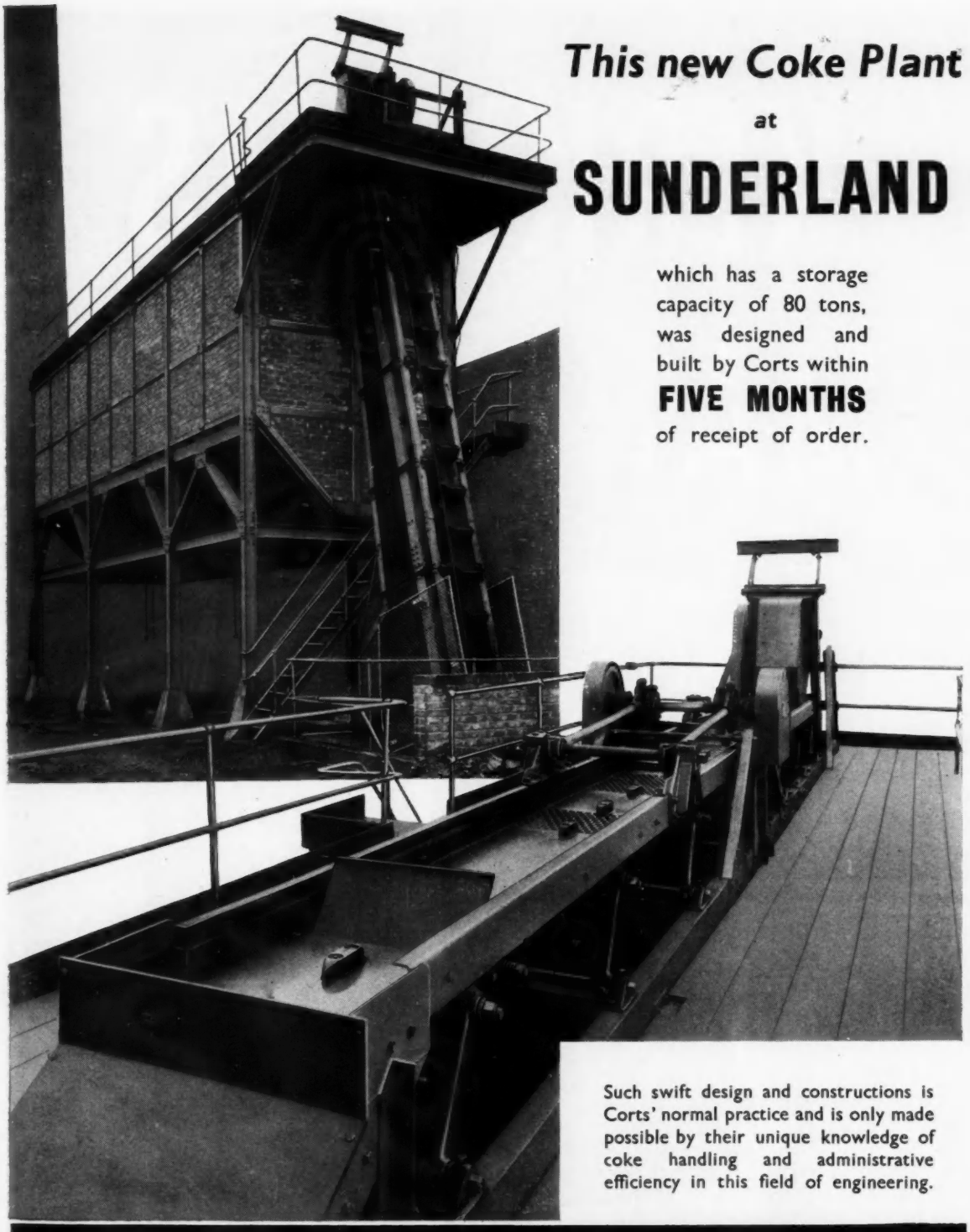

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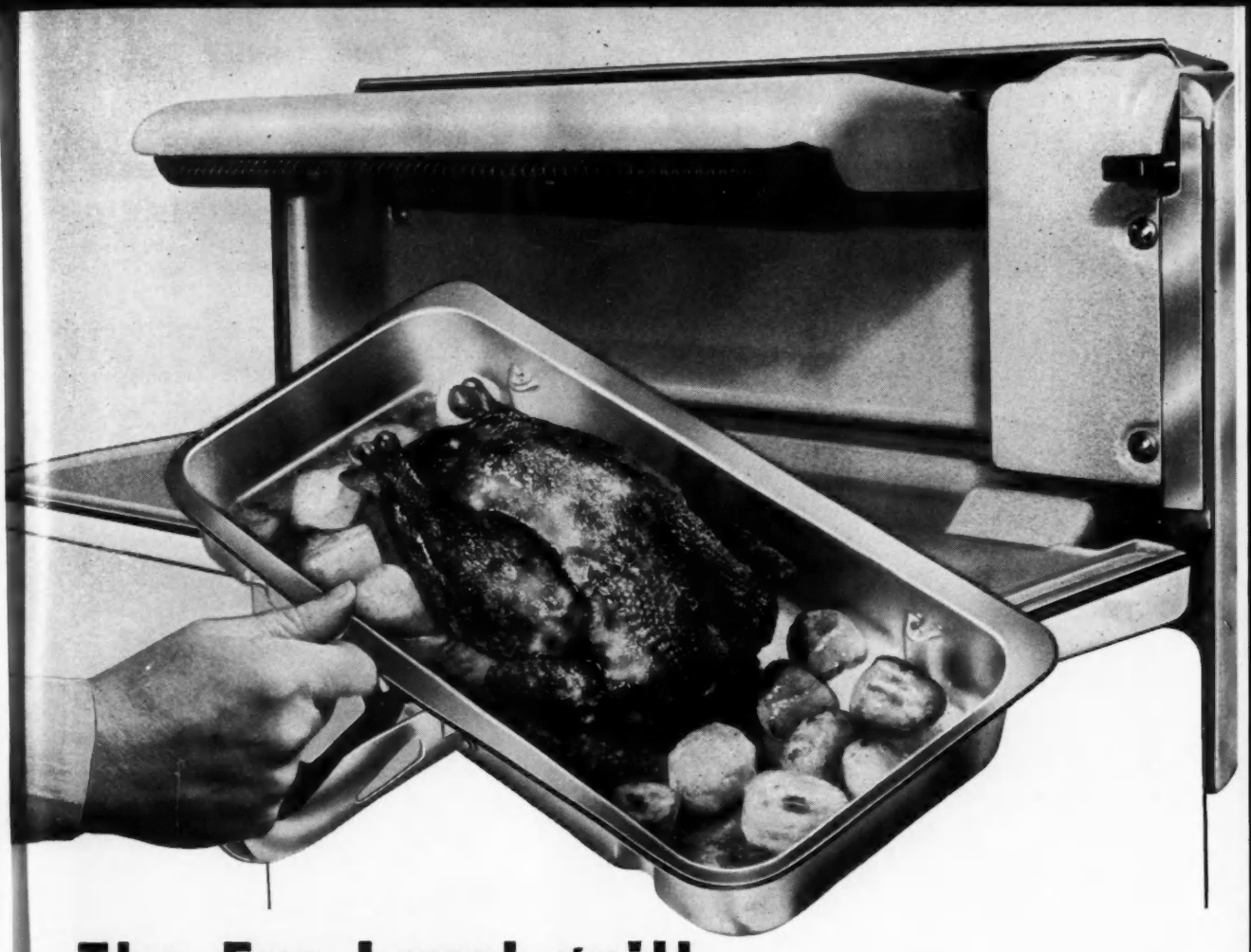

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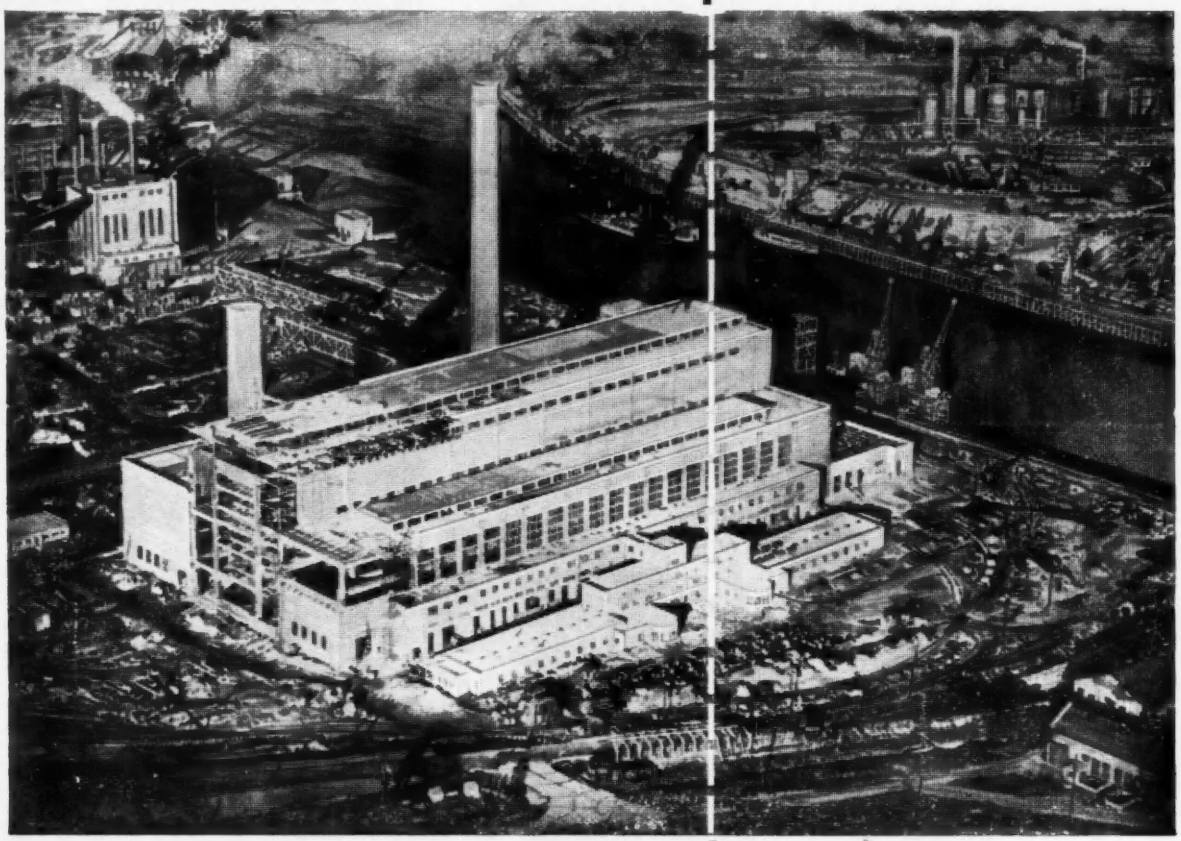

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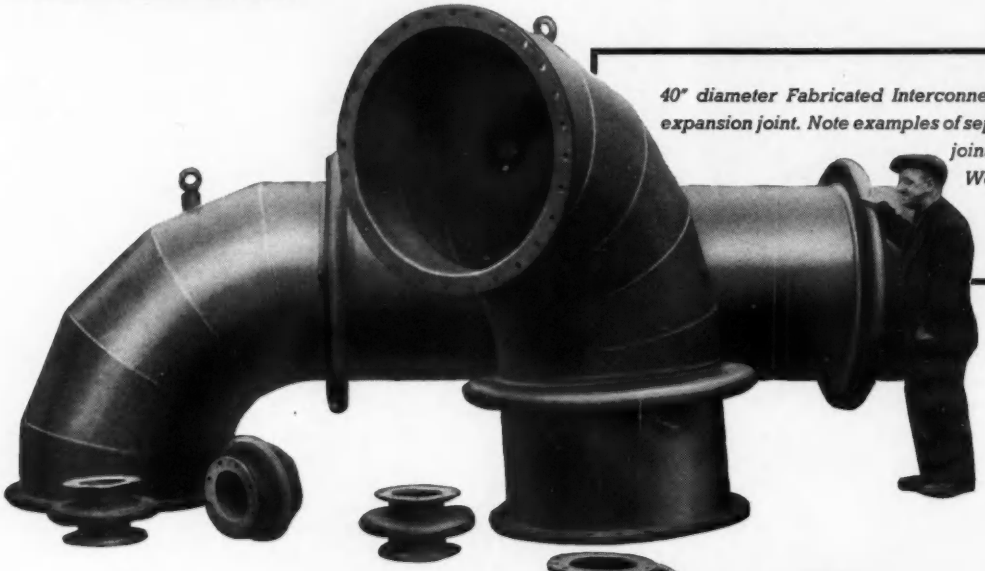

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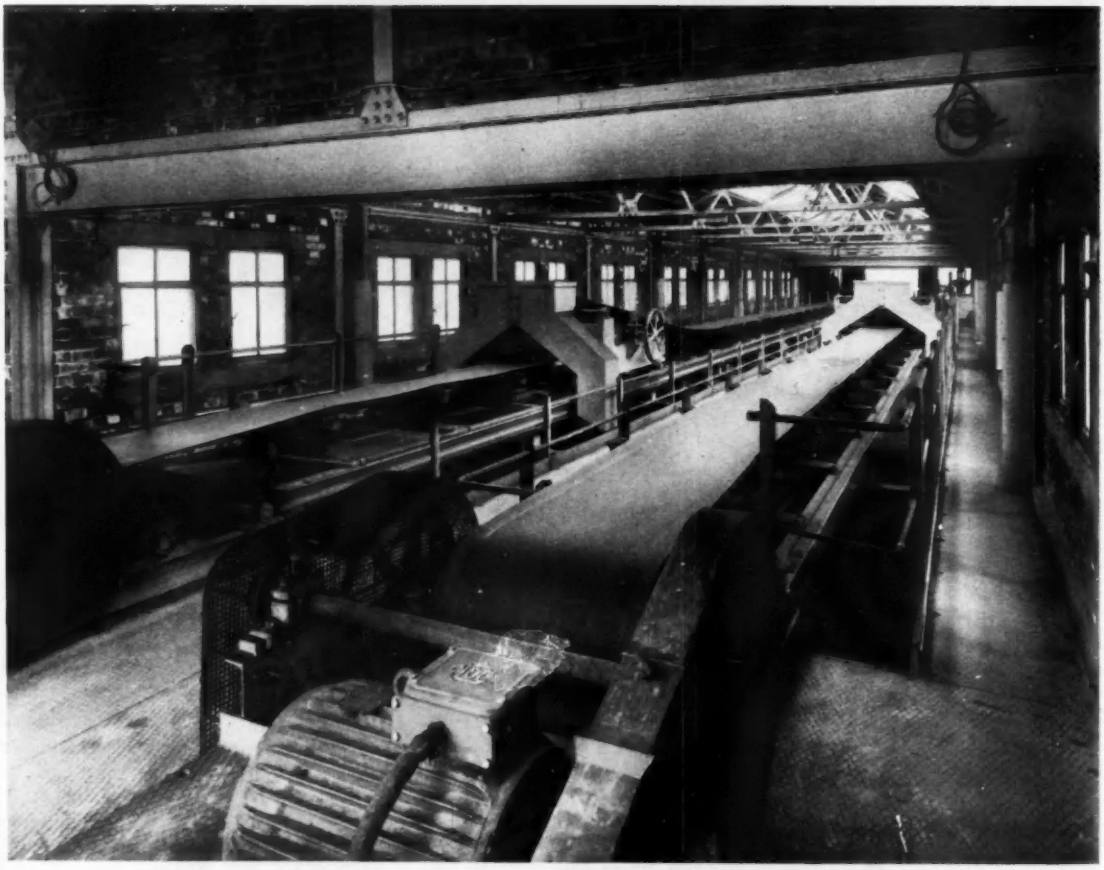

Photograph published by the courtesy of the North Western Gas Board.

Unretouched photograph, showing two of the four Coal Conveyors Feeding Vertical Retort Benches at Wigan Gas Undertaking

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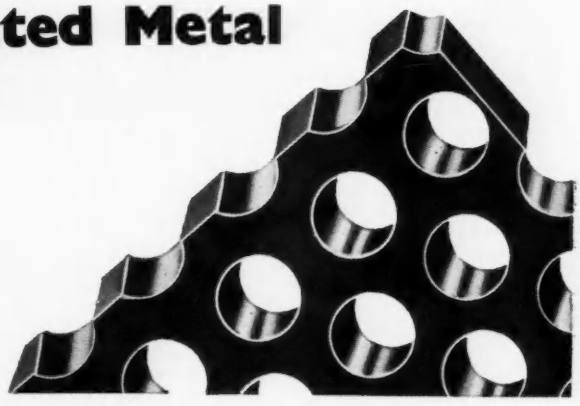

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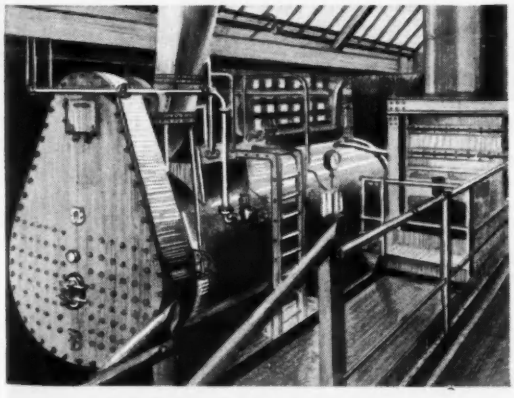

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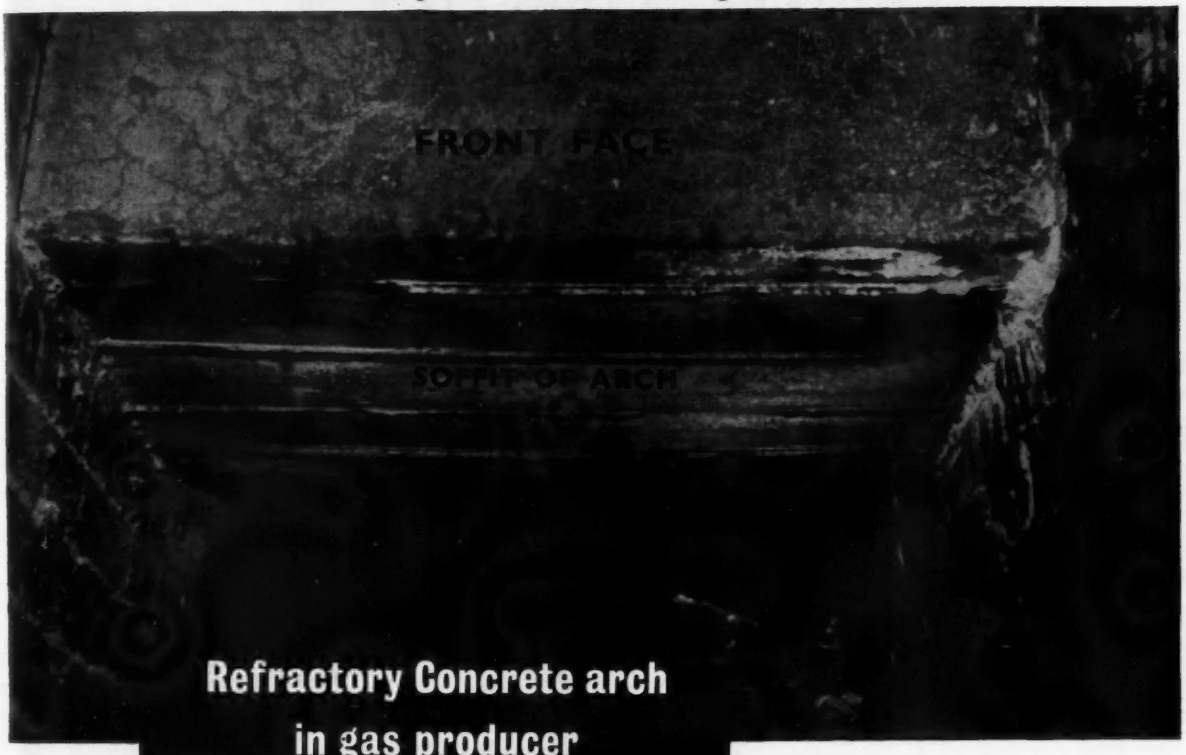

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Photo by courtesy of J. W. Young Esq., M.Inst.Gas E., Lurgan Borough Council, Gas Dept.

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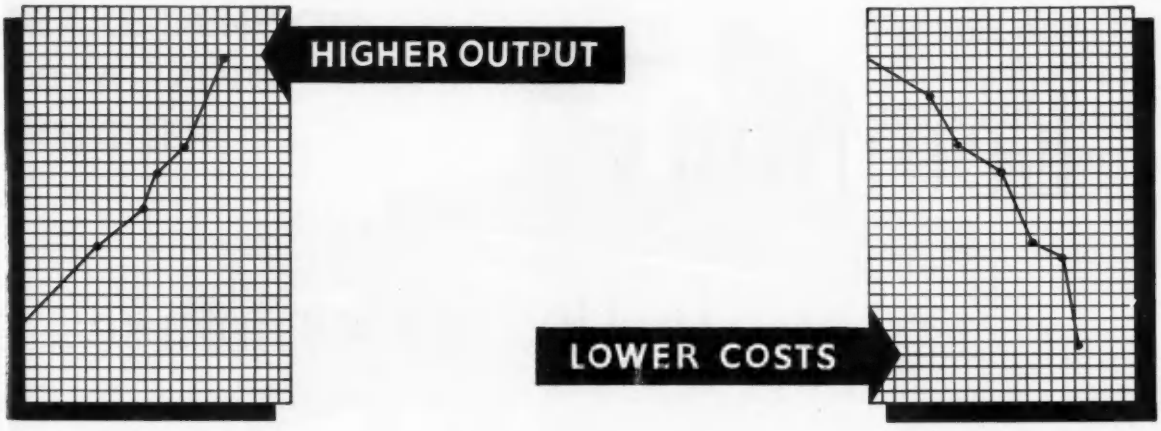

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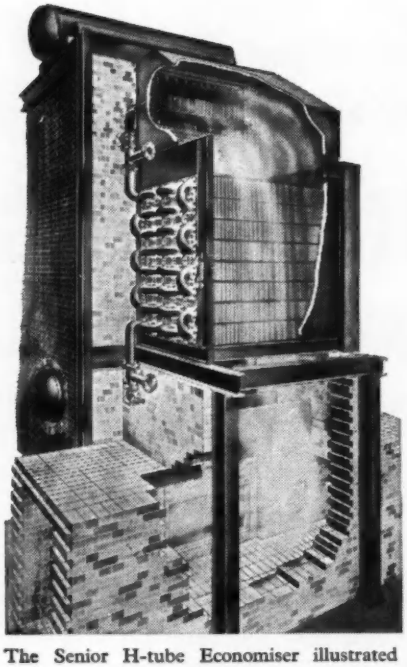

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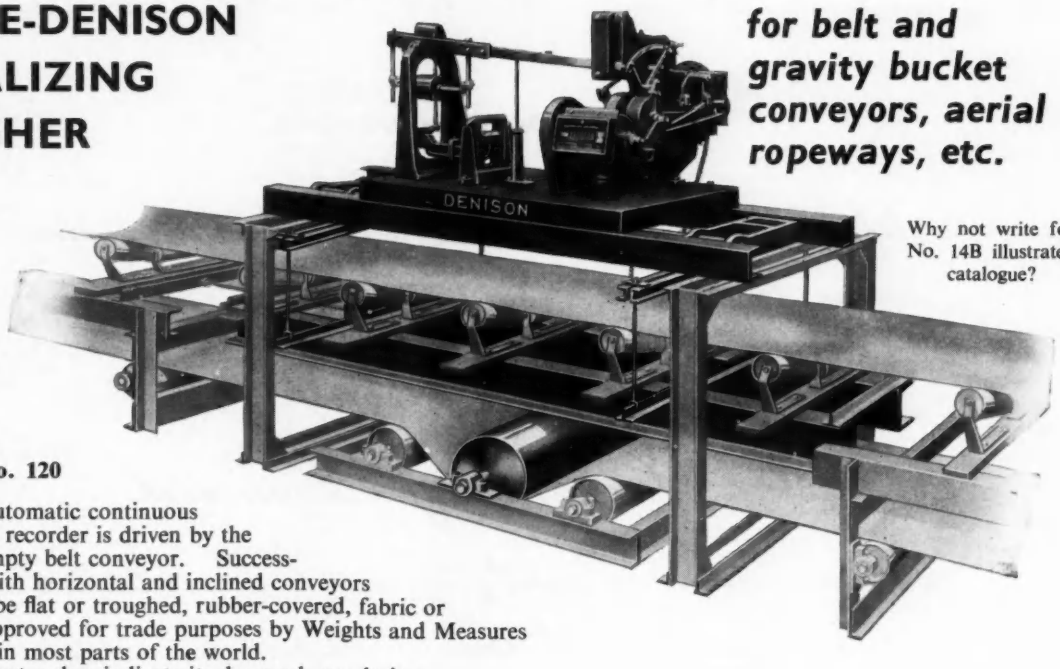

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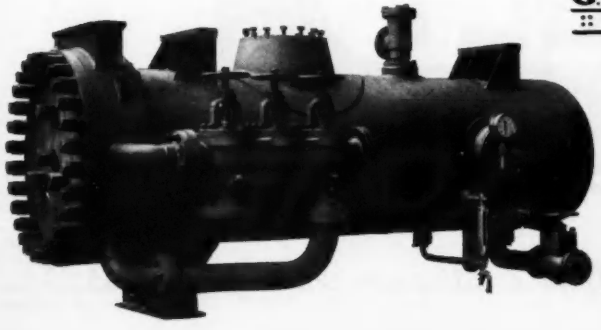

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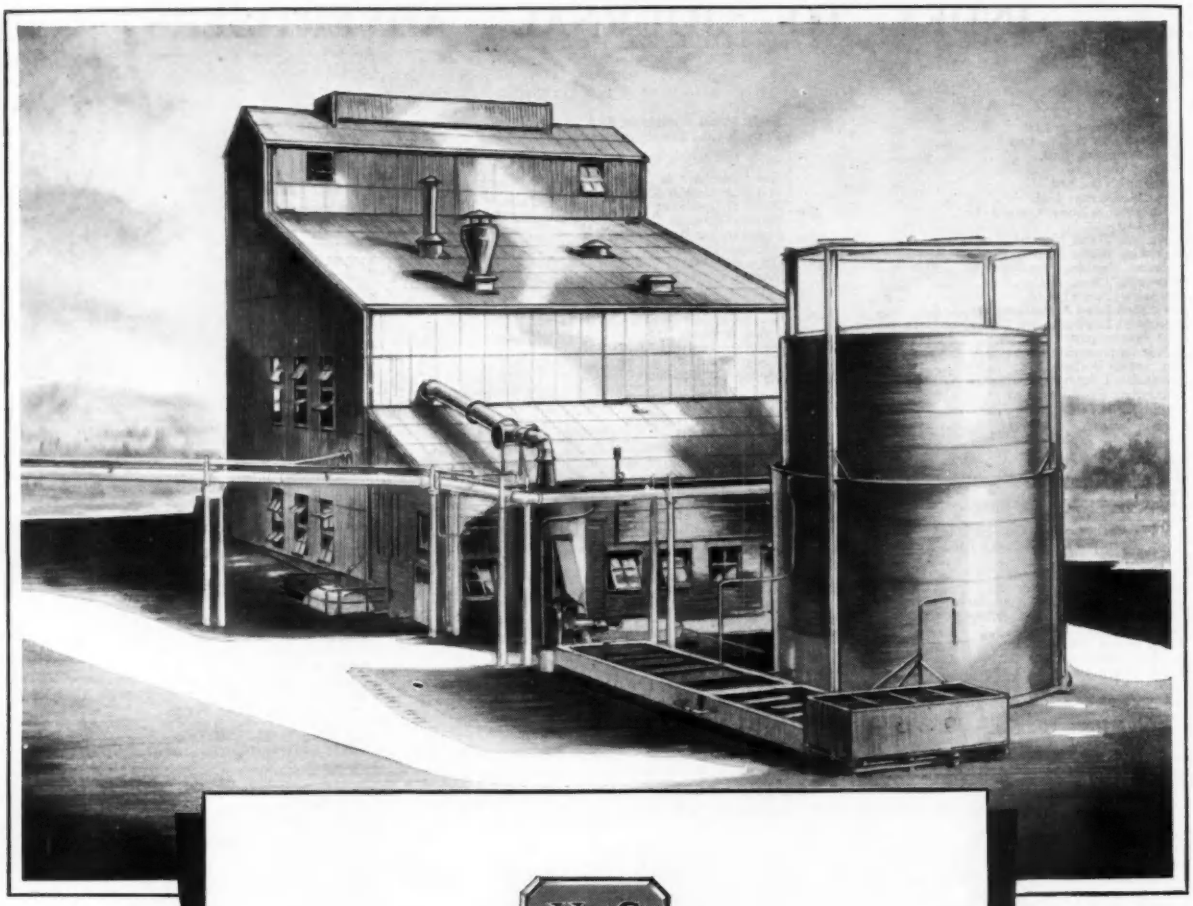

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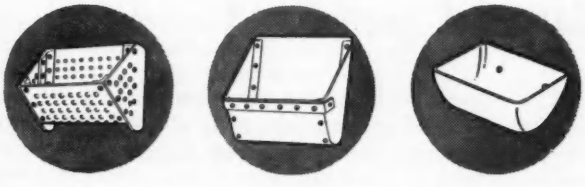

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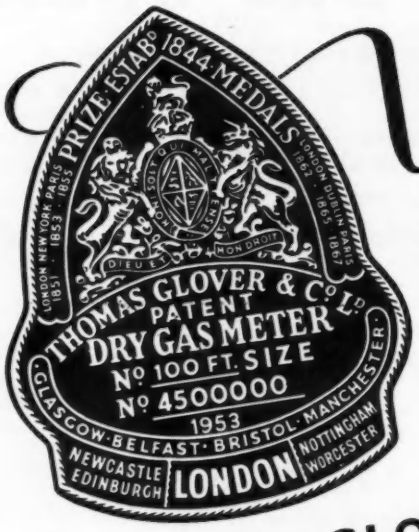

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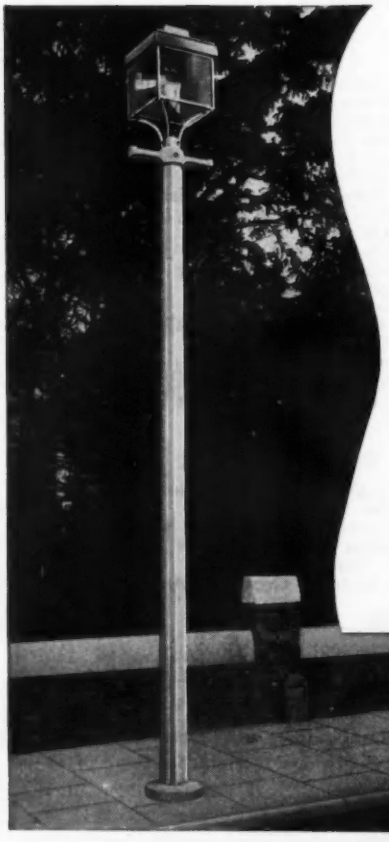

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Gas Journal

VOL. 278. NO. 4743 106TH YEAR April 28, 1954

NUCLEAR POWER FOR INDUSTRIAL USE

The planetary system has been examined by many minds over many hundreds of years. It is many years since T. Lucretius Carus tackled the subject, suggesting that, without void, nothing can be crushed. At that time, of course, Lucretius did not contemplate the consummation of the nuclear reactor and the prospect of striking-off protons (fission) which may in the future find its application electrically in the home. We have been reading with great pleasure the James Clayton Lecture on 'Nuclear Reactors and Power Production' given by Sir Christopher Hinton, Deputy Controller of Atomic Energy at Risley, to the Institution of Mechanical Engineers. It is an address of absorbing interest, though, of course, the information which Sir Christopher imparts is limited due to security reasons. It seems to us to pose the query whether we shall be able to cope scientifically with fission for peaceful purposes in the epoch which lies in front of us.

As a unit among scientific heat producers the gas industry occupies high place. We cannot think it is realised by the housewife, however, that, when switching-on her electric fire or her electric immersion heater, she may in fact be using energy derived from a gasworks. Much energy in the form of electricity is today used on a gasworks before the housewife can 'turn on to gas.' Moreover, the stage has already been reached when the British Electricity Authority is prepared to purchase surplus current from gas boards. This interlinkage of energy is all to the good. Eventually we may see less animosity between Mr. Therm and Mr. Kilowatt. Some time may elapse, but it is not fantastic to contemplate precipitation of the event as a result of fission.

Sir Christopher Hinton is of opinion that the replacement of coal-fired boilers by nuclear reactors as the heat source at power stations should, before many years have passed, be economically sound. Moreover, it would be justifiable if it could act only as an adjustment factor in the demands of the coal miner and the consistent shortage of coal. We think that no nation other than Britain, which dwells above coal measures, would have allowed such coal shortages to occur. The British housewife is indeed meek. Salvation of Britain's present fuel impotence, as evidenced by rationing of inferior coal over the past decade, may yet be found in 'thermal reactors.' Such reactors would produce supplies of fissile material for destruction; they would also be capable of supplying energy to gasworks, to other industrial premises, and also to the home. We have not yet reached perpetual motion, but it seems that breeder-reactors may well prove self-sustaining after the initial charge.

The estimated cost of electricity generation from a prototype thermal reactor, said Sir Christopher Hinton, is in the neighbourhood of a penny a unit. This is about 50% higher than the average cost of generation from coal-fired power stations. And what under the earth is this 'average cost?' To us it seems to rise automatically as the coal reaches the surface. Of course, a low price for electricity generation can be quoted if a reactor is used as a dual-purpose plant, manufacturing plutonium for defence purposes as its primary product and turning out electrical power as a by-product. It would, however, be unwise to justify a large-scale nuclear power programme on this basis. 'If,' said the author, 'we can start at a penny a unit, it would seem wise to go ahead and build a few large installations which would give us the necessary operating and engineering experience for future plants capable of generation at lower cost. It should certainly be possible to bring the figure down to about 0·8d. per unit in this way within a few years. In the meantime, there is every possibility that the cost of coal, and therefore of electricity generation from coal, will increase. It would not be surprising if nuclear power became fully competitive within another 10 years.'

The Ridley Committee has stated that there is an unsatisfied demand for coal in the United Kingdom amounting to some 20 mill. tons a year. On a free market, coal could command what price the N.C.B. asked and what the consumer could pay, or be *perpetually* in winter discomfort. Development of nuclear energy on a large scale as an alternative source of power is unquestionably an urgent national requirement.

Available evidence suggests that the price of coal will continue to rise steadily. Reserves of certain special coals are running out. The tendency will be to treat

coal more and more as a valuable chemical substance and less as a raw fuel for burning in its unprocessed form. And we agree with the author that nuclear energy can fit into this picture without disrupting the gas industry. In the long run it is destined to appear as a partner. The decent application of nuclear energy is to generate electrical power on a large scale, thereby leaving suitable grades of coal for town gas manufacture and, as a corollary, synthesis gas for the chemical industries in general.

Development of nuclear energy, Sir Christopher Hinton concluded, might proceed in two stages. The first stage would involve building a large number of thermal reactors for installation in power stations. This part of the programme would aim at making up for the present coal shortage which seems likely to continue at a level of about 20 mill. tons a year. It would probably take between 20 and 30 years to reach this target. During this time, the by-product plutonium would be produced in the thermal reactors, and this would have to be separated and processed for use in the second stage. The second stage would involve the use of reactors employing highly enriched fuel—in particular, plutonium from the first stage. Whether these reactors would be fast or intermediate, or whether they would be thermal reactors of a type at present unknown to us, cannot safely be predicted. It would, however, be one of the objectives to achieve breeding of fissile material on a commercial scale.

'We are, at present, only on the threshold of atomic energy development. What we are doing today will look as clumsy and costly in a 100 years time as one of Watt's early steam engines looks to us.'

MORE FUNDS FOR SCIENCE

A more cheerful note than has been apparent for some years is struck by the Advisory Council in the Report for 1952-53 of the Department of Scientific and Industrial Research. The gas industry, through the dissolution of the Gas Research Board, is not now so concerned as it used to be with the aims, objects, and achievements of the D.S.I.R. But it is its duty, expressed and implicit, to follow and co-operate in the work of the Fuel Research Board, the Road Research Board (rather more indirectly), the Water Pollution Research Board, and other grant-aided organisations dealing with cast iron, coal, coke, iron and steel, instruments, and, of course, ceramics.

The application for more money from the British Coke Research Association, which has advanced rapidly from its comparatively recent inception, is of considerable interest. This application for extended funds, which is not, by the way, the first, concerns a full-scale test-oven plant. It is well known that reserves of high-grade coking coals in this country are decreasing rapidly and that if cokes for metallurgical purposes are to be ensured, means must be found for utilising lower-grade coals. Small-scale experiments in the laboratories of private companies, the Research Association, and the Fuel Research Station have shown that there is real promise of being able to provide satisfactory cokes from suitable blends which include coals that are individually unsuitable. It is an old story, but a new project has been designed to enable these possibilities to be fully investigated to the production stage. The estimated cost of the plant is about £400,000, and approval has been given for a grant not exceeding £100,000, provided that special contributions of not less than £300,000 are made by industry. We doubt whether the Director of the British Coke Research Association will have to organise a 'flag day.'

In its present report, just published, the Council of the D.S.I.R. not unnaturally records its satisfaction that a plan has been agreed for the Department over the next five years. It is anticipated that non-industrial staff will increase at the rate of 150 a year, with about one-third that number of industrial staff. Funds to match will be approved annually during the period of expansion. It is also assumed that additional funds will be made available, bringing the net yearly resources of the Department to more than £6 mill. Net expenditure for 1952-53 was £5,207,455.

Referring to industrial productivity, the report states that an allocation of money has been recommended for research projects, mainly in universities, on subjects which include management organisation, incentives to both management and operatives, problems of resistance to technical change, and promotion and training, including the recruitment and use of university graduates in industry.

The report is a long one. It runs to well over 300 pages, covering only in brief an extensive field which ever becomes wider. It turns from the establishment of cement works in Uganda (direct result of Building Research Station work) to simple precautions against fire, such as the shutting of windows and doors in empty rooms. 'There is no doubt,' the report states, 'that many fires would be restricted, and might even fail to develop through lack of air, if this simple precaution was generally observed.' Again, it turns from research on diffraction gratings at the National Physical Laboratory, indicating its possibilities in industry for automatic control machine tools and chemical plant, to discussion of the hydraulic transport of coal from the working face to the surface. As far as horizontal transport is concerned, the 'results so far obtained indicate that hydraulic transport of coal for distances of several miles will be economic, provided the technical problems of plant design can be solved.' There is also interesting reference to a dual-purpose heat pump cooling a domestic larder and providing at least 500 gal. of hot water per week for one-third of the normal electricity consumption. It is described as a 'practical possibility.' Again, 'progress in the investigation of latent heat storage is encouraging.' This, of course, relates to the work of the British Electrical and Allied Industries Research Association; and record is made that the Association is assisting the Ministry of Fuel and Power on electrical methods in the preparation of coal seams for gasification *in situ*.

In a note on the future, at the end of its report, the Council says that a specially welcome feature of the proposals for the next five years is the provision that a shortfall of expenditure in any year may—subject, of course, to the necessary funds being voted by Parliament—be made good in subsequent years. 'This,' says the Council, 'will give the flexibility on which it has laid so much stress . . . The broad effect of the arrangements will be to bring the D.S.I.R.'s post-war plans nearly to completion by 1959 . . . The Council is greatly relieved to see this clear road ahead.'

PATENT OFFICE LIBRARY

Immediate open access to over 3,500 scientific and technical periodicals in all languages has been provided by a new extension to the Patent Office Library, which is now open to the public in the basement of the headquarters building in Chancery Lane, London. All this periodical material, which ranges over the whole field of technical invention from agriculture to zinc, will now be conveniently arranged on open shelves. It will cover items published since 1920. Hitherto much of it has only been available on request. Earlier volumes will continue to be supplied on demand. Another important addition will be the provision of a special section for bibliographies and abstracts—indispensable keys to the searching of scientific literature. The extension has been made possible by a general rearrangement of the library and by overhauling the wartime accumulation of unbound volumes. These arrears have been reduced from 22,000 to 14,000 in the past three years and will be further reduced to 10,000 by the end of this year. The Patent Office Library, a reference institution of international repute, was established in the mid-nineteenth century, has a total stock of 360,000 volumes, and is open to the public until 9 p.m. Monday to Friday, and until 5 p.m. on Saturday. It is visited by nearly 2,000 people a week.

'NEAT' ARGUMENT

Among work recently published by the Institute of Fuel is an investigation undertaken at the Fuel Department at Leeds University which led to the author, Mr. B. H. Holland, being awarded the Students' Medal of the Institute. The investigation, characterised with the thoroughness associated with the laboratories of the Department and the training given in them, concerned the structure and stability of flat flame burners. During the past decade, and more, increased attention has quite rightly been paid to the application of 'non-aerated' burners, giving diffusion flames, to both domestic and industrial requirements. It is axiomatic that just as much heat is produced in the diffusion flame as in an aerated flame. The difference lies in the rate at which it is produced. Combustion of a pre-mixed gas takes place in a small area with the production of high temperatures which may lead to uneven heating. Diffusion flames usually have a high content of incandescent carbon, and the large area of the flames due to the relative slowness of combustion provides radiant heat uniformly over a large area. Among the advantages of diffusion flames is the complete absence of light-back and the high stability of the flame when the flow rate is suddenly reduced. Mr. Holland points out the efficiency of the diffusion flame is much higher than that of the bunsen flame when gas quality fluctuates at peak periods, and density and combustion characteristics vary. The author does not burke the issue, however, that the diffusion flame can lift and blow-off if combustion conditions are unfavourable.

RESULTS OF EXPERIMENT

The author's experiments were directed to the causes of instability and their explanation. Town gas is probably used more than any other gas for heating purposes, and comparison of its combustion characteristics with those of some of its constituents shows that carbon monoxide is primarily responsible for any low levels of stability. Hydrogen, which has the same heating power as carbon monoxide, gives exceedingly stable flames. 'Butane . . . gives large smoking flames if streamline flow is maintained, while, if turbulence is introduced and a more aerated flame is obtained, combustion is satisfactory—but the flame tends to lift before such conditions are reached.' Hence it is desirable under operating conditions that the flame should remain seated near the burner port, because a seated flame is more stable and less likely to be blown-off by a sudden draught or a shock wave. Design of the burner is the main factor governing stability. In the investigation conducted by Mr. Holland a twin-hole type burner proved most successful. In general, however, any type of burner which maintains a source of ignition near the burner port at high rates of flow will be safer in operation than other types of burner. The pattern of investigation to which we have referred is important in its bearing on burner design and the successful application of gases in changing circumstances.

THE STORY OF OIL

The growth of the oil industry has been so rapid and so widespread in its influence that there are no major industries, particularly in the sphere of fuel, which can afford to ignore it or are not affected by it. Since the war there has grown up in Britain a vast refining industry now sufficient for the nation's needs and for export. A dozen large refineries will produce 28 mill. tons of products, and it must be remembered that crude oil provides the base material for such widely dissimilar substances as detergents, solvents for paints, plastics, and many other uses. We recently visited an exhibition which opened at the Science Museum, South Kensington, for a month, beginning April 9. Developed by Shell, this exhibition demonstrates simply and graphically how science in its various forms is applied to the search for oil; its production, transport, and distribution to the consumer. In each of the 22 display cases, artistic merit has been an aim as well as clarity of exposition. The primary object is to illustrate the oil industry's application of some of the more generally known sciences, such as geology, physics and chemistry. Special panels are devoted to marine transport and pipeline systems. Of obvious value to school teachers, the exhibition should also attract university students, especially those with scientific and technological interests, since it enables them to discern the place that each particular science or technology occupies in the industry. To date, 'The Story of Oil,' as the exhibition is called, has been displayed principally at university cities and at those which maintain technical colleges; its influence has no doubt been wide. We can recommend a visit not only because it is of interest as a profile of an industry becoming increasingly associated with our own, but also because it illustrates how well the Shell Petroleum Company publicises its activities.

IT'S HOW TO SAY IT

'Words and their Work' is the title of the paper which wins the Gas Council's Challenge Trophy for the best paper read at a Gas Salesmen's Circle during 1953. Mr. H. W. Merrison, Service Manager of the Tottenham Division, Eastern Gas Board, deserves his success, in our opinion, for his obvious ability to recognise what is one of the most important facets of the salesman's work. The ever increasing importance of a correct and imaginative verbal approach, of the diplomatic use of the telephone, and of writing the follow-up letter is apparent in these days when first impressions are often the means of putting our foot in the door. Mr. Merrison is stated to have won the Trophy for 'originality of subject, for value to the salesman and for logical and skilful presentation of his arguments.' At the same time, the judges felt that the standard of the papers would be improved if salesmen's circles would concentrate on the craft of salesmanship itself. However, we offer our congratulations to Mr. Merrison, who will receive his prize during the Gas Sales and Service Conference at Southport this year. The panel of judges in the competition comprised Mr. G. W. Battison, Editor of 'GAS SERVICE,' Mr. Norman Hudson, Chief Commercial Officer, North Eastern Gas Board, and Mr. R. J. Gregg, Publicity Manager of the Gas Council.

Correspondence

NITROGEN IN PURGING PRACTICE

DEAR SIR,—I was very interested in the paper on 'Nitrogen in Purging Practice' given to the Eastern Junior Gas Association by Mr. P. Caston Forbes, an abstract of which you published in the 'GAS JOURNAL' of April 7. I should like to point out, however, that Mr. D. W. Ault's remarks in the discussion that the first paper on this subject was given by Mr. F. M. Birks in 1938 are not correct. In point of fact, I gave a paper to the Midland Junior Gas Association on October 21, 1937, entitled 'The Purging of Water-Sealed Gasholders.' The reason for my writing this note is to emphasise the importance which junior engineers attach to the safe operation of gasworks plant.

Yours faithfully,
F. J. BENGOUGH,
Engineer and Works Manager.

Gasworks,
Windsor Street,
Birmingham, 7.
April 13, 1954.

THE 'ROCHDALE' PROCESS

DEAR SIR,—Some observations on the 'Rochdale' process as applied to a setting of four 40 in. Glover-West retorts, injecting hot uncleaned producer gas from adjacent producers, may be of interest. The coal carbonised consisted of three parts of Scottish doubles, one part of Yorkshire, 80% slack.

Working to an ultimate calorific value of 400 B.Th.U., a throughput of 5½ tons coal per retort per 24 hours was easily obtained. Coke output increased enormously, almost 90 tons being available for sale in a week's working.

There was a serious drop in make per ton of coal, and in spite of the greater throughput the overall output from the bed did not appear to be increased as compared with (1) conventional steaming and producer gas external dilution, (2) minimum steaming and producer gas external dilution.

The coke on discharge was rather too hot to handle, and gave off a light blue smoke. Grey, well carbonised, coke had a volatile content of 0·5 of 1%; (2) the not so well carbonised sample gave 0·9 of 1%. Used for blue water gas production there was evidence on the blow of high volatile coke. The coke in general appeared to be denser, but, being larger, the weight of bulk load did not show any variation from normal practice.

An attempt was made to increase gas yield per ton by raising the combustion chamber temperatures, but negligible improvement resulted, inferring that there is an optimum temperature situated somewhat below the average of that required for steaming practice. Economy may result from the possibility of reducing carbonising temperatures, and hence of less fuel to producers.

By injecting blue water gas the results were altogether more pleasing, and during this test an hourly make was obtained which was believed to be greatly in excess of possible maximum makes, when the blue water gas was taken in at the inlet to condensers.

The cost of external blue water gas is, of course, another matter.

Expressing an opinion at this stage, although it is only fair to point out that conditions were not ideal, and that the plant was largely makeshift, I am not satisfied that, using producer gas injection, more therms were obtained per unit of plant. Otherwise, with external producer gas dilution for short-range calorific value control, it ought to have been possible to show an increased make.

In general it would appear that the bed of four retorts (secondary air preheat obtained from circulation round the bottom converted combustion chamber) is capable of giving 15,000 cu.ft. per hour: (1) when steamed; (2) low steaming and external producer gas; (3) the 'Rochdale' process with injected and external producer gas.

I think the approach to economy in the small works may perhaps lie in the ratio of saleable coke to producer requirements.

Yours faithfully,
J. W. YOUNG.
Engineer and Manager.

Lurgan Gas Department, Lurgan,
Northern Ireland.
April 17, 1954.

Personal Notes

RETIREMENT OF MR. F. C. BRIGGS

MR. FRAS C. BRIGGS, M.B.E., is retiring on April 30 from the post of Divisional General Manager of the West Midlands Gas Board's Wolverhampton and District Division, after more than 40 years' service in the gas industry. Born in London, he received his early engineering training in the City of London, and joined the Gas Light and Coke Company as a mechanical apprentice, later becoming an engineering pupil, and was appointed to the engineering staff in 1914. In July, 1916, he was appointed Engineer and Manager of the Town of Dudley Gaslight Company and eventually became Engineer, Managing Director and Deputy Chairman of the enlarged Dudley, Brierley Hill and District Gas Company and a Director of the Bilston Gaslight Company, which offices he held until the gas industry was nationalised. At vesting day he was appointed General Manager of No. 2 Division of the West Midlands Gas Board, covering 10 gas undertakings, from Wolverhampton and Willenhall in the north to Stourbridge and Halesowen in the south. He is a double Silver Medallist in Gas Manufacture and Supply and a Member of the Institutions of Civil, Mechanical, Gas, and Structural Engineers, and an Associate Member of the Institution of Chemical Engineers.

Mr. Briggs has taken an active part in the many organisations in the gas industry before vesting day, being a member of the national and area committees and chairman of many of the Midland branches. The list includes the British Gas Council, Midland Commercial Gas Association, British Commercial Gas Association, Midland Counties Coke Association, Federation of Gas Employers, and Midland Co-operative Tar Scheme. Before going to Dudley he was for a time a Vice-President of the London and Southern Junior Gas Association.

He was President of the Midland Association of Gas Engineers from 1926 to 1928 and a Member of the Council of the Institution of Gas Engineers for five years. In the last war he was Assistant Gas Engineering Adviser to the Regional Controller and a Captain in the 3rd Worcs. Home Guard.

Despite his many business interests Mr. Briggs has lent his aid to many local activities—although he says that as a servant of the public in a statutory company he has always felt it necessary to avoid political associations. He was for many years Treasurer of the Dudley Juvenile Organisations Committee. The main work of this committee was to raise funds for the maintenance of, and to administer, a camp for Dudley children at Ashley Burf, near Stourport, given by Mr. T. W. Tanfield. The committee was eventually disbanded and its work largely taken over by the Youth Sub-Committee of the Dudley Education Committee. The Trustees of the Camp presented it to the Education Committee, on trust, for the use of the Dudley children for ever.

He was Chairman of the Dudley Boy Scouts Association for many years until the last Annual General Meeting when his pending retirement compelled his resignation. Mr. Briggs was a Member of the Council of the Dudley and District Chamber of Commerce,, and President from 1937 to 1939. He has been a member of the Dudley Rotary Club almost since its foundation—since June, 1922—and President in 1930-31.

DR. H. HOLLINGS, O.B.E., has been appointed to the Board of Cannon (Holdings), Ltd.

COLONEL SIR HAROLD SMITH, Chairman of the Gas Council, has accepted an invitation to join the Board of Directors of the Redheugh Iron & Steel Company (1936), Ltd.

MR. H. H. BROWN, Manager of the Exeter and District Sub-Division of the South Western Gas Board, has retired after 40 years in the gas industry. He became Engineer and General Manager of the Exeter Gas Light and Coke Company in 1937, and was appointed Manager of the Sub-Division in 1949.

MR. C. ROBSON, who has been elected President of the Teesside and South-West Durham Chamber of Commerce, is Commercial Director of the Power-Gas Corporation and Ashmore, Benson, Pease, and Co., Ltd., Stockton-on-Tees. He is also Chairman of the Teesside Area Productive Committee.

MISS K. COWIE has retired after 38 years in the gas showrooms at Grimsby. During her career she has worked under five local managers, and to mark her retirement the present manager (Mr. W. A. Pask) presented her with a parting gift on behalf of her old colleagues, with all good wishes for a long and happy retirement, at a farewell gathering held at the showrooms.

MR. T. A. TOMLINSON, M.B.E., was elected to the North Western Section Committee of the Institute of Fuel in 1933, and has been an active member ever since. He was elected a Fellow of the Institute in 1947 and has now been elected a Member of Council. He was appointed Hon. Treasurer to the Section on January 1, 1945, and Hon. Treasurer and Assistant Hon. Secretary (Press and Programmes) in 1953.

MR. STANLEY ROBINSON, Chairman of the Midland Tar Distillers, Ltd., has been elected President of the British Wood Preserving Association. Mr. Robinson, who was one of the original founders of the Association, is Chairman of Robinson Brothers, Ltd., and a Director of the Mountsorrel Granite Co., Ltd., J. E. C. Lord (Manchester), Ltd., the Creosote Producers Association, Ltd., the Immingham Storage Co., Ltd., Midland Tar Distillers, Inc., U.S.A., and Robinson, Butler, Hemingway, & Co., Inc., U.S.A. He is a Past-President of the Association of Tar Distillers, the British Road Tar Association, and the International Road Tar Conference, and was Vice-President of the British Wood Preserving Association during 1949-54.

MR. ANDREW TRAILL, Works Superintendent at the Hamilton works of the Scottish Gas Board, has been appointed Station Engineer there. A native of Leven, Mr. Traill received his engineering training with Henry Balfour & Co. at Durie Foundry, Leven. Before going to Hamilton he held appointments with the Berwick and Tweedmouth Gas Light Company, Ayr Gas Company, Forfar Gas Department, and St. Andrews Gas Company. He has been works superintendent at Hamilton since 1946.

Woodall-Duckham Construction Co., Ltd., announce that MR. ROBERT RAY will retire on April 30, having reached the normal retiring age for the Company's staff. Mr. Ray joined the Company in 1928 and for 26 years has represented its coke oven interests in the North of England and in Scotland with much distinction and success. Following upon Mr. Ray's retirement, the Company's Sheffield Office at 448, Abbeydale Road, Sheffield, will be closed, and all matters at present dealt with there will be handled by its representatives at 22, St. Anne's Square, Manchester, 2, or 1, Castle Street, Edinburgh, 2.

LIEUT.-COLONEL R. I. MUSSON, M.C., has been appointed by the Minister of Fuel and Power to be Chairman of the Eastern Gas Consultative Council in succession to ALDERMAN R. TURNER, who retires on May 11. Lieut.-Colonel Musson, who served in both world wars, has been a member of the Eastern G.C.C. since 1951.

Mr. T. B. V. HIRST and Mr. P. WERTHEIMER have been appointed Directors of a new Company, Tekon, Ltd., 50, Baker Street, London, W.1, established to explore and promote certain inventions and improvements relating to safety devices for use with both domestic and industrial gas appliances, and also to deal in general with gas apparatus designed in Germany. Primary interest of Tekon, Ltd., lies in the development of reliable and economical bi-metallic elements for ensuring swift and dependable ignition of gas under all conditions of use. Mr. Hirst was with Ascot Gas Water Heaters, Ltd., from 1933 to 1943, and then with Thomas De La Rue & Co., Ltd. (Gas Group), between 1948 and 1953. Since that time he has acted in a consulting capacity. Mr. Wertheimer's association with Ascot and De La Rue runs through a similar period and, in common with Mr. Hirst, he has in some ways equivalent technical experience in the development of gas appliances.

Obituary

RAE P. NORMAND

It was as we went to press last week that we heard the sad news of the death of Rae Normand. The funeral took place last Friday, and was attended by a large number of his relations and of friends from the gas industry, among whom were many representatives of the Evening Star Lodge and the Chapter.

Rae Normand was born in 1885, the son of Ernest Normand and Henrietta Rae, Royal Academician, figure and portrait painter. From them he inherited a love and keen appreciation of art in its many forms. He was educated at Dulwich College and in Paris, and he spoke both French and German fluently. His uncle was the late W. A. Surridge, a partner in Messrs. E. Foster & Co., Coal Factors, which firm Rae Normand himself joined, thus becoming intimately connected with the gas industry, particularly in the South and the Midlands. He subsequently took a partnership in the firm, and worked actively for them until he retired on Foster's being taken over by Messrs. Stephenson Clark.

Rae Normand will, however, remain mostly in our memories as Secretary of the Evening Star Lodge, which office he held from 1926 until he handed over the responsibilities a month ago. To this honorary and honourable task he brought constant care and great efficiency, and he was endowed with supreme tact. He never spoke unkindly of any man; but then, kindliness and generosity were for him the reward of life. My wife, who had known him for upwards of 25 years, said last week: 'Rae was not really of this generation; he had time for one.' Many will realise that and bless the memory. Those nearest and dearest to him at home are assured of the sympathy and affection of a host of friends.

C. A. K.

MR. T. F. C. POTTERTON writes:

Having been closely associated with Rae Normand for almost 40 years, may I be permitted as a contemporary to pay tribute to a man whose friendship was valued in the widest sense within the gas industry, particularly on the works side. His connection with E. Foster & Co. gave him the fullest opportunity of exercising his commercial abilities. Others have a more intimate knowledge of his business career, but it is perhaps fitting that I should refer to his much revered uncle, William A. Surridge, whom the older generation of today remember so well, and who doubtless gave him an insight into those necessary qualities in salesmanship which led to his success in business.

In the masonic field, he rendered great service to his Mother Lodge, the Evening Star, No. 1719, in which, after passing through the various offices to the Chair and his appointment to London Grand Rank, he succeeded the late Walter T. Dunn as Secretary. This office he filled with dignity and efficiency for 28 years. He received Grand Honours as P.A.G.D.C. in 1946, an occasion that gave the greatest happiness and satisfaction to the Lodge. Rae Normand had a great capacity for good fellowship, he was never known to speak ill of anyone, and his absence from our midst will be a loss in a very real sense.

MR. THOMAS W. HENDERSON, District Superintendent, East Midlands Gas Board, died suddenly on Easter Monday at his home at Stamford, Lincs. He was a native of Leicestershire and moved to Stamford in 1952 on being appointed District Superintendent.

Diary

April 29-30.—EAST MIDLANDS GAS BOARD: Staff Conference, Skegness.

April 29.—NORTH THAMES G.C.C.: Caxton Hall, Westminster.

April 30.—MANCHESTER AND DISTRICT SECTION, I.G.E.: Annual General Meeting. Chairman's Address, H. Johnston, Chief Engineer, North Eastern Gas Board; at Manchester.

May 4.—EAST MIDLANDS G.C.C., Victoria Station Hotel, Nottm. 11.30 a.m.

May 4.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, 11 a.m.

May 4.—MIDLAND JUNIORS: Annual General Meeting, Staff Mess Room, Birmingham. 6.30 p.m.

May 5.—YORKSHIRE JUNIORS: President's Day: Visit to Moor End Gasworks, Cleckheaton, 11 a.m.; British Belting and Asbestos, Ltd., Cleckheaton, 2.30 p.m.

May 7.—NORTH OF ENGLAND SECTION, I.G.E.: Third Annual General Meeting. Stockton-on-Tees.

May 7.—LONDON JUNIORS: 'Gas in the Sugar Industry,' H. Capper, Divisional Industrial Representative, South Eastern Gas Board, 178, Edgware Road, 6.30 p.m.

May 8.—EASTERN JUNIORS: Annual General Meeting to be followed by afternoon visit. Ladies invited. Harwich.

May 8.—SCOTTISH JUNIORS (EASTERN): Visit to Dumbarton Gasworks.

May 13.—LONDON JUNIORS: Whole-day visit to Ciment-Fondu Works.

May 13-14.—WALES AND MONMOUTHSHIRE SECTION, I.G.E.: Spring Meeting, Porthcawl.

May 17-18.—EASTERN SECTION, I.G.E.: Annual General Meeting. 'The Development of Safety Measures in the East Midlands Gas Board,' D. W. Ault. Skegness.

May 19-20.—GAS SALES AND SERVICE CONFERENCE. Floral Hall, Southport. The special train from Euston on May 18, will leave at 3.35 p.m., and not 3.25 p.m. as previously announced.

Institution of Gas Engineers

London and Southern Section

New Retorts Opened at Kensal Green

Changes in the syllabus for the session now drawing to its close enabled the London and Southern Section of the Institution of Gas Engineers under the Chairmanship of Dr. J. Burns to accept an invitation to the Kensal Green works of the North Thames Gas Board to coincide with the opening of a new Woodall-Duckham continuous vertical retort installation by Mr. Henry F. H. Jones, Deputy Chairman of the Gas Council. The function took place on April 13, and the attendance was one of the largest of the session. In the presence of Mr. Michael Milne-Watson (Chairman of the Board), Mr. F. M. Birks (Deputy Chairman) and other members of the Board, Mr. Jones, after receiving members of the works committee, cut a tape and opened the doors leading to the new retort house. Members afterwards inspected the plant, which incorporates many modern details of design and layout. Later they were entertained to tea.

A Pioneering Station

Mr. MICHAEL MILNE-WATSON, in thanking Mr. Jones for performing the opening ceremony, welcomed the guests, including Mr. J. S. Smith and Major G. C. Hyde, Assistant Secretaries of the Ministry of Fuel and Power; members of the Gas Consultative Council; representatives of trade unions; representatives of the contractors, notably Mr. T. C. Finlayson, Chairman of the Woodall-Duckham Construction Co.; the joint works committee, and a representative of the Chief Engineer's Departmental Committee. Kensal Green had, said the Chairman, always been a pioneering station, having been built in 1845 by the Western Gaslight Company to compete with older-established companies on the basis of high quality gas. In 1891 six sets of carburetted water gas plant were built and they were still at work. Increased demand for gas had made it impossible to spare them so far, although they had earned their retirement.

In 1908-09 the Gas Light and Coke Company installed the first full-scale vertical retort house there. It was built by the Woodall-Duckham Company, which entrusted the engineering of it to Francis Richards—a man who came to be loved and respected throughout the industry. In 1941 the Woodall-Duckham Company built No. 2 vertical retort house, with the important introduction of taper on the minor axis of the retorts. The new No. 3 installation now opened incorporated further modifications to taper. Initial experience of the working of the new plant led the Board to hope for yet higher carbonising efficiency.

Novel Features

An important innovation was the building of the steelwork for the retort settings entirely independently of the coal bunkers, which were carried on a welded steel portal structure. For that, as in other matters, he felt the contractors would not grudge the Board's own design staff a share of the credit. The design also paid attention to working conditions. The open top gave a free flow of air across the stages, and to ensure a clean atmosphere there were dust extraction plants, cold air douches, and fume extractors. The retort house lobbies were up to the Board's highest standard, and although readily accessible to the operating stage, were clean and comfortable.

Ground floor of the new retort house, showing centre portal frames which span the retort benches and support the overhead coal bunkers, conveyors, and roof structure.

Dr. J. Burns (Chief Engineer, North Thames Gas Board), Mr. Henry F. H. Jones (Deputy Chairman, Gas Council), Mr. Michael Milne-Watson (Chairman, North Thames Gas Board), and Mr. C. C. Cunnold (Station Engineer, Kensal Green) admire the new plant.

By this time next year, continued the Chairman, there should be at work another development in the continual search for the most efficient conversion of raw materials into heat.—*viz.*, the open cycle waste heat turbine for the direct production of electricity. The electricity so produced would be used on the works, and the Board was negotiating with the London Electricity Board to send any surplus into the grid.

Great Expectations

Mr. HENRY JONES said he was glad to have had the opportunity of opening the fine new plant and he congratulated the Board and the contractors on its installation. One could nearly always note some element of originality in the design of new plant when visiting any of the works of the North Thames Board, and in this case the most interesting feature

was the taper on the major axis of the retort, the introduction of which was foreshadowed in a paper presented to the Institution of Gas Engineers in 1949 by Dr. Burns and Dr. Weston. All who were interested in carbonisation would await with interest the technical results of that modification, which was designed to improve the travel of the coal through the retorts.

In addition to making enough gas to cook for 100,000 families by means of modern stream-lined cookers, the new plant would make a useful quantity of coke. As a matter of interest, he calculated that to carbonise the 27½ mill. tons of coal used annually by the gas industry would require 200 units similar to that which they had inspected, working day and night throughout the year. The plant they had seen represented the last word in efficiency in the conversion of coal to gas and coke, but if it was to work at full efficiency it must be supplied with coal of a suitable quality and at the right price.

Mr. F. M. Birks (Deputy Chairman, North Thames Gas Board) with Mr. T. Campbell Finlayson (Chairman of the Woodall-Duckham Construction Co., Ltd.).

People in the gas industry sometimes wondered whether the people responsible for fixing coal prices were also interested in horse racing, for he believed there was a principle well-known to the handicapper whereby the weight a horse was asked to carry in a race was increased as the horse grew older. The gas industry was an old industry, but it did not approve of a system which invoked an ever-increasing burden of coal prices with every year that passed. They were concerned when they knew, as was stated by Sir Harold Smith recently, that coal delivered to a gasworks in London now cost four times as much as in pre-war days, while house coal prices were only a little more than 2½ times the pre-war level.

Showing the coal charging stage, fume extraction ducting, and gas offtakes.

Other Sources of Gas

If supplies of coal were ample and if the price were more attractive it would not be necessary to look for other sources from which to make gas, but the apparent scarcity of the type of coal needed and the price at which it was offered had driven the industry to look for other sources of raw material. It was encouraging to know that there were two separate processes now in commercial operation in this country for the gasification of heavy residual oils. One —in the Midlands—was based on foreign patents; the other—in South London—had been developed from the laboratory stage by engineers and scientists working in the gas industry in this country. In addition, the Gas Council had begun its exploration for natural gas which was expected to cover a five-year period in the first instance, and to cost £1 mill. Considerable progress had been made, and the Council's activities now extended to Scotland, Yorkshire, Lincolnshire, and Sussex. Whatever the result, they would have the satisfaction of knowing that at least they had tried to find what might prove to be a valuable addition to the fuel resources of the country. But at present, and for years to come, the main source of gas production must be coal.

Mr. H. M. LAWRENCE (Portsmouth) voiced the thanks of the visitors to the North Thames Board, and Mr. MICHAEL MILNE-WATSON briefly replied.

Another Management Course

The second residential course in management studies to be held by the Institution of Gas Engineers was opened on Monday by the Chairman of the Gas Council, Colonel Sir Harold Smith. It was described as 'a high level course for the key men of the industry.' Brooklands County Technical College, at Weybridge, Surrey, is the centre, and the course is of six weeks' duration.

In stating that the course is made possible by a fund placed at the disposal of the Institution by the Woodall-Duckham Co., Ltd., for the advancement of education in the gas industry, the Institution also acknowledges the support of the Gas Council and the co-operation of the College.

The object, says the Institution, is to provide the course for 'selected young men, being members of the Institution, who have attained the standard of Associate Membership (or equivalent qualification) and who have already shown aptitude in accepting a measure of managerial responsibility and would benefit by further education in management.' There are 12 students from among employees of the area boards, and three employees of members of the Society of British Gas Industries.

The highly concentrated course covers a wide field. Students take part in discussion and debate. Lectures and other activities are under the main headings: Self-expression and committee procedure; management studies; the practical application of management principles; industrial relations; external and other relationships of management, and technological studies. There are visits to various works and other places of relevant interest.

The Institution says the fact that it is a course of study and education for management does not indicate in any way that attendance is a guarantee of promotion. The opportunity is being given to stand back from the normal concentration on a specialised aspect of the industry and to see the whole pattern in perspective. Furthermore, students will be able to assess their own capacities in a manner which would be impossible in the normal non-residential part-time course.

Set in pine-wooded spacious grounds, the trees punctuated with rhododendron bushes and daffodils, the College has a quiet atmosphere conducive to relaxed study. Living as a small community, the group will have the advantages of close contact and association.

Sir Harold Smith, at the informal opening ceremony, gave his personal advice to the students. 'A good manager,' he said, 'can organise himself out of a job and go away on holiday content in the knowledge that everything will be all right.'

On the subject of delegating responsibility, he said that the industry which had capital liabilities of over £330 mill. and a turnover of over £260 mill.; which employed nearly 150,000 persons, and

whose activities covered the whole of England, Scotland, and Wales, obviously could not be managed in detail by a few people stationed in London. Delegation was necessary. 'The first step in delegation of the industry is given effect to under the Gas Act by the Minister, who appoints 12 area boards, each of which is responsible for the day-to-day operations within its own area for work being co-ordinated at the Gas Council, which also raises the capital necessary for financing the industry and undertakes certain specific functions.

'To learn how to delegate is one of the things which a manager must learn. I have been very interested to find on visiting the gas industry since it was nationalised, the number of cases where people obviously have a profound belief in the necessity of delegation so long as it stops at their level.'

On consultation, Sir Harold said that it was most important for a manager to see that everyone concerned knows what plans have been decided upon. The more consultation that could take place before definite decisions were arrived at the better.

Mr. W. Robson Brown, M.P., Chairman of the Board of Governors of the College, introduced Sir Harold and said the gas industry showed "exceptional pioneer spirit in organising a course of this nature.' He added that he was under no illusions about the part the gas industry was going to play in the economy of the country. The coal industry, for example, might well be saved by the gas industry.

Mr. Brown is also Chairman of the Education Committee, British Coking Industry Association.

Mr. J. T. Haynes, President of the Institution, said the industry would be even better today if such courses had been available to the earlier generations. 'It makes me feel that the future of the industry is going to be immeasurably greater than ever we had anticipated.' Looking at the 15 students assembled before him, Mr. Haynes concluded: 'You are inspiring in us at higher level, trust and confidence. It is up to you to justify that confidence.'

Supporting, Mr. J. H. Dyde, Past President and a member of the Council of the Institution, stressed the fact that the gas industry was acknowledged to be one of the friendliest; the course was valuable in that it permitted friendships to be made that would last their whole careers. It had been designed to bring out and develop such qualities as self-expression, self-confidence, and informed leadership.

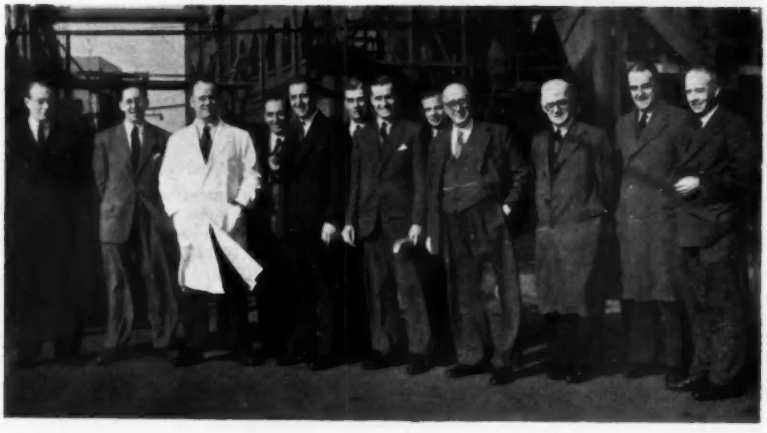
Mr. F. E. F. Salter, Assistant Sales and Service Manager, East Surrey Division, South Eastern Gas Board, the senior pupil attending the College, spoke for the students, and thanked Sir Harold and the other leading gas industry personalities who had supported the ceremony.

At the end of the course, Mr. H. F. H. Jones, M.B.E., Deputy Chairman of the Gas Council, will deliver the valedictory address.

The British Oxygen Co., Ltd., has introduced a new quarterly technical bulletin under the title of *Torch*. Its purpose is to keep industrial gas users up to date with regard to new processes and new applications, and for that reason, although it will carry some general interest features, its contents will be mainly technical and practical. *Torch*, which is being issued free, will go to operators and management in the engineering industries and to the Company's own staff at home and overseas. A foreword points out that *Torch* is not entirely new; it may be said to have been re-born, for it previously existed as a technical bulletin whose usefulness and popularity have induced the Company to increase its circulation to a wider field.

EASTERN SECTION I.G.E.

at Bracebridge Works, Lincoln



As reported last week the members of the Eastern Section of the Institution of Gas Engineers visited the Bracebridge Works, Lincoln, for their 'Chairman's Day' on April 8.

Above is a photograph of one of the groups conducted round the works.

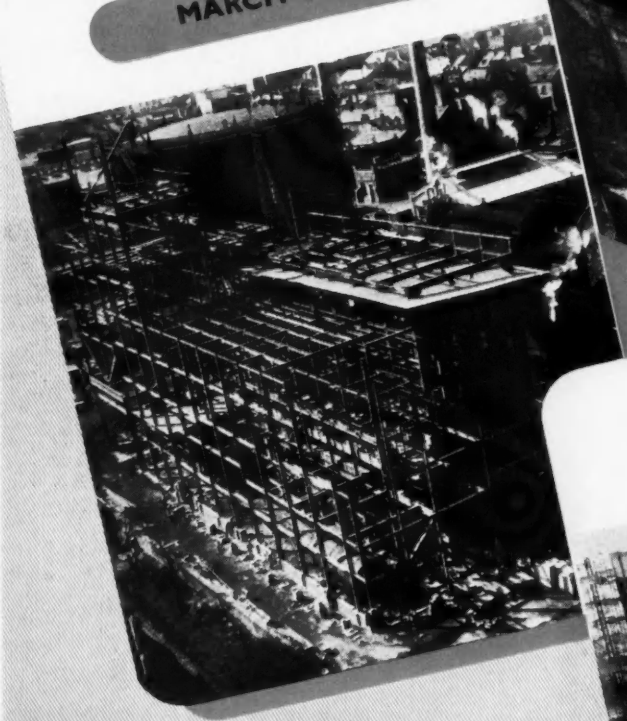
On the left Mr. Bernard Clarke, M.B.E., Divisional General Manager, Lincolnshire, and Chairman of the Section, is seen in the centre of a group of principal guests explaining features of the works to (left to right), *Mr. J. Hunter-Rioch (Secretary of the Section), Mr. D. W. Ault (Divisional Engineer, Lincolnshire Division), Mr. Sydney Smith (Chairman of the East Midlands Gas Board), Mr. J. S. Smith (Assistant Secretary, Ministry of Fuel and Power), Mr. E. O. Rose (Divisional Engineer, Tottenham), and Mr. W. Morland Fox (Director of W. J. Jenkins & Co., Ltd.)*

PROGRESS . . .

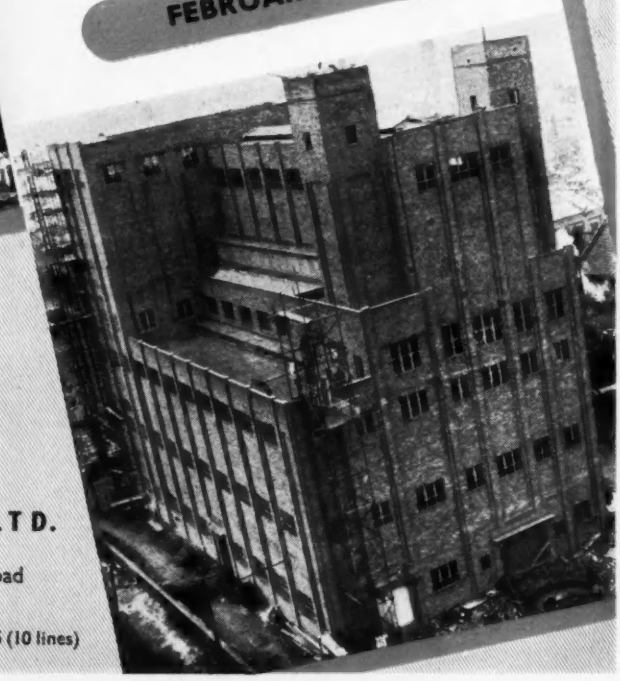
The New Installation of W-D Continuous Vertical Retorts soon to be in operation at the St. Helier Works of the Jersey Gas Light Company Limited. The gasmaking capacity will be over 3,000,000 cu. ft. per day.

SEPTEMBER 1952

MARCH 1953



FEBRUARY 1954



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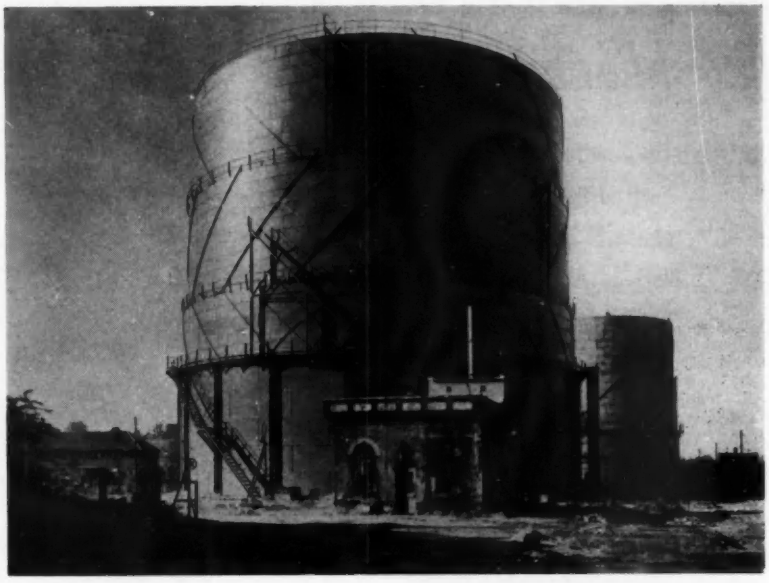
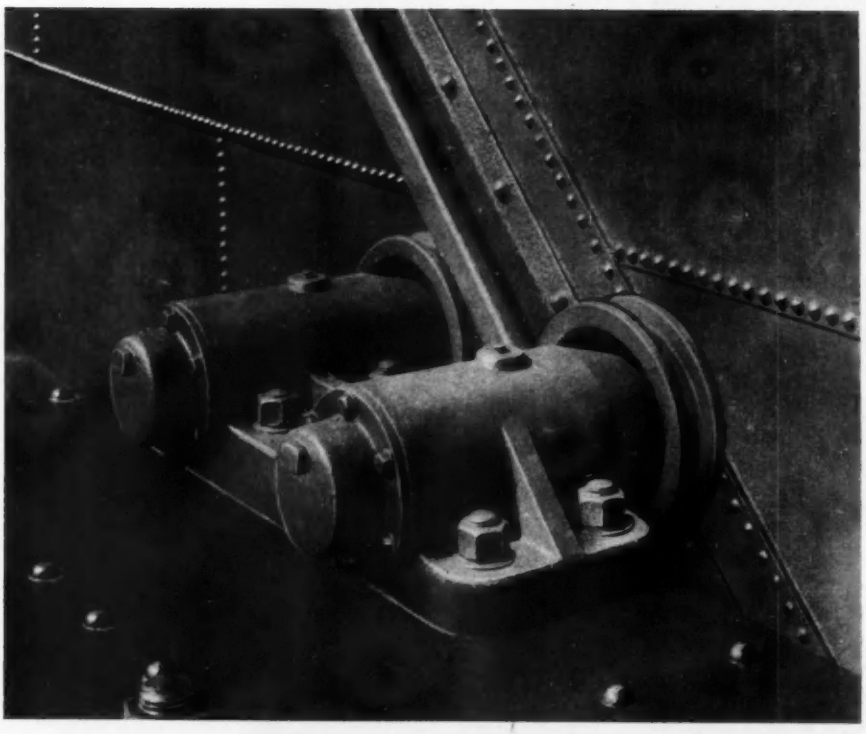


Another Clayton Holder

RECENTLY COMPLETED



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Heavy Chemical Industry and Productivity

The Association of British Chemical Manufacturers issued last November a progress report on the steps which had been or were being taken to implement the recommendations in the report of the Heavy Chemicals Productivity Team. The Steering Committee and the six Area Committees have continued their activities and the third series of meetings is now under way. Firms affected by the report have nominated high level managerial liaison contacts for each of their works for the appropriate Area Committee. About half a dozen of these contacts for firms not already represented on the Area Committees are being invited at a time to attend meetings of the Area Committees to discuss the progress they are making in implementing the recommendations and the problems and difficulties they are encountering. For the time being discussion is centred on four main recommendations dealing respectively with technical graduates, instrumentation, work study, and materials handling.

A popular version of the report attractively and simply presented under the title 'Good for Us,' to make an appeal to the shop floor, has been published and is being widely distributed by the firms concerned to all levels in their factories to stimulate and sustain further interest and discussion in the team's recommendations in the cause of productivity. The first print of 25,000 is nearly exhausted. Copies are obtainable at 6d. per copy post free from the Association of British Chemical Manufacturers at its new address at Cecil Chambers, 86, Strand, London, W.C.2.

Technical Graduates

The issue of a detailed questionnaire regarding present and future estimates of requirements of technical graduates of all kinds has been deferred until certain aspects of the team's report have been further discussed in order that a realistic forecast of the demand may be ensured. As regards chemical engineers, for whom there is a particularly great demand, the Institution of Chemical Engineers has prepared a comprehensive survey of the facilities available for training at universities and technical colleges and this will be of great assistance to the industry. There is a special need to stimulate the use by industry of the facilities which were created at nine technical colleges in 1951 for training employees to obtain Higher National Certificates in chemical engineering, and steps have been taken to this end.

The Association has set up an Instrumentation Advisory Committee to assist firms with their problems and to stimulate and expand the design and production in this country of the requisite instruments. Active consideration of this problem has been stimulated by the publication of two papers on the subject by Mr. Young, Head of the I.C.I. Instrument Group, and Professor D'Ombrain, of the Battersea Polytechnic respectively.

The Proceedings of the Work Study Conference organised at Buxton last October with the assistance of Imperial Chemical Industries, Ltd., has been published and can be regarded as an authoritative text book on the subject. It is available to members of the Association and the trade unions at 7s. 6d. per copy post free and to anyone else at 12s. 6d. and is obtainable from the A.B.C.M. office. Many firms have taken up the subject with great enthusiasm and the A.B.C.M. has been able to advise them on suitable courses of instruction and on consultants. To provide a further stimulus, the Association has appointed a Work Study Advisory Committee.

Materials Handling

Reports issued by other productivity teams on materials handling have created so much interest and activity in the industry that so far the Association has not found it necessary to take any further steps in the matter. Action is in hand on other recommendations. A Joint Committee of the Association and the British Chemical Plant Manufacturers' Association is studying the problems of standardisation of chemical plant and equipment in the widest sense. Standard costing has created great interest and two papers on it from members of the Association have been in great demand.

Physical Society Exhibition

Space restrictions made it necessary for the Physical Society to limit the number of firms and establishments exhibiting at its 38th exhibition, held at Imperial College, Kensington, S.W.7, recently. However, despite some absentees there was still much of interest to be seen and a number of instruments on show having some application, direct or indirect, to the gas industry. It is to these instruments that the following comments relate.

The B.T.-H. Company

The Research Laboratory of the British Thomson-Houston Co., Ltd., introduced a new integrating manometer in which the pressure to be integrated with respect to time is applied to the inside of the bellows. The bellows is constrained by a number of Eureka wires, which act as a strain gauge.

These wires are made components of a Wheatstone bridge, the other arms of which are mounted inside the bellows to ensure temperature compensation. If D.C. is supplied to the bridge so formed, the out-of-balance voltage is proportional to the pressure. Outputs of 2 m.v. per inch of water are readily available.

If the bridge is supplied with A.C., and a transformer with low secondary resistance placed across the diagonal, the output from this transformer can be rectified mechanically, and applied to a fluxmeter. By this means the fluxmeter circuit resistance is kept low, and the damping high. The fluxmeter measures mv/second, and deflections proportional to the pressure integrals are obtained. Sensitiveness of 1 radian per inch of water/second are obtainable.

Two-Image Pyrometer

The British Iron and Steel Research Association demonstrates a two-image pyrometer and an interesting furnace scanning periscope. The latter was designed for investigation of temperature distribution over the roof of an open hearth furnace. The requirement of viewing a large area of roof through an aperture in the furnace wall is combined with photographic recording or photoelectric measurement of brightness temperature. The most convenient position for inserting the instrument is in the back wall of the furnace about 2 ft. below the junction of wall and roof and some 3 ft. above the bath of molten steel. The angular coverage required to view the roof from front to back is 0°-120° from the horizontal. Since the instrument must remain in use for periods of many minutes a water-cooled jacket is essential. The size of entrance apertures had, therefore, to be kept to a minimum and the usual arrangements for producing a wide angle periscope could not be used.

A reflecting head unit was designed using a concave mirror and a partially reflecting plate. The field of view is switched to three different positions using three small entrance apertures, covering the 120° required, by rotating the reflector plate. A conventional optical system then presents the image to the eye or camera at the other end of the instrument. Each zone of view is a circle of about 50° diameter. The resolving power in the centre of the zone is approximately five minutes of arc. The periscope, inserted horizontally into the furnace, may be rotated about its axis. This together with rotation of the reflector plate allows any point in the furnace to be viewed.

The Cambridge Instrument Co., Ltd., and Cinema-Television, Ltd., both firms well known to the gas industry, exhibited nothing of direct interest. The former concentrated on instruments of a medical nature, and the latter on an automatic frequency monitor.

Dawe Instruments, Ltd., had a number of exhibits ranging from sound level indicators to a so-called 'slow motion' stroboscope. Worthy of particular mention was a high-frequency ultrasonic thickness gauge, an instrument for the non-destructive measurement of an unknown wall thickness, with particular application where only one side is accessible. The principle of operation is identical with the standard ultrasonic thickness gauge which has been demonstrated at previous exhibitions. A quartz crystal driven from a variable frequency oscillator is used to generate ultrasonic waves in the material under test, the oscillator frequency being adjusted to produce a 'resonance' in the material. The thickness of a given material can be determined from the fundamental resonant frequency which is equal to the difference between adjacent harmonic resonant frequencies.

Among a host of exhibits by Elliott Brothers (London), Ltd., the high speed temperature indicator might be singled

out. This instrument has been developed for use in temperature measurement applications where rapid response to temperature changes is of importance. It is particularly applicable in multipoint installations where many variables need to be logged at a central control station, with the aid of a single instrument and switch.

It employs resistance thermometers of the normal platinum wound type connected to an A.C. fed Wheatstone Bridge network. The out-of-balance e.m.f. derived from the bridge circuit is fed to a high gain amplifier which in turn energises the reference phase of a two-phase servo-motor. This drives the pointer to which is directly coupled a high precision cam-corrected potentiometer until balance is restored. Full scale travel is effected in one second for full scale interval of 50°C. or greater. Shorter temperature ranges, spread over the full scale, can be accommodated involving a small increase of travel period.

High response recorders and 'Megger' insulation testing sets were shown by Evershed & Vignoles, Ltd. Also on their stand were examples of their well-known 'Servo' and other special fractional horse-power motors for D.C. and A.C. Those for use with servo mechanism have a high torque/inertia ratio. Some of the motors include generators for providing a damping component proportional to speed so as to increase stability and avoid hunting. The generators in the D.C. machines are of the permanent magnet type giving the minimum of ripple, whilst on the a.c. machines they are of the drag-cup type having, therefore, minimum inertia.

Fielden (Electronics), Ltd., showed a 'Servograph' of new design, a proximity switch 's' which is a sensitive and stable form of the Fielden 'Tektor,' and a proximity meter for measuring extremely small changes of capacitance. Another exhibit was a high speed rotary D.C. potentiometer, developed for measurement of temperatures for as many as 120 points with provision for control and alarm when any one temperature exceeds a pre-set value.

A Bowle's viscometer was one of the exhibits on the stand of Nash & Thompson, Ltd. In this a steel cylinder of diameter 1 in. is suspended by a helical spring in a cylindrical cavity in a massive steel block, which can be rotated by a motor at speeds varying between 10 and 250 r.p.m. The liquid under test fills the annular gap (0.002 in. wide) and its viscosity may be determined from the angular deflection of the inner cylinder when the outer is rotated at a known speed. Using a range of calibrated springs, viscosities in the range 1-100 poises may be measured. The outer block is purposely made heavy so that it may be brought to temperature in an oven and retain that temperature throughout a test, thus obviating thermostatic control.

Management Training in the Public Services

The training of managerial grades in the public services formed the theme of a recent series of seven lectures arranged by the Institute of Public Administration. Although the gas industry was not specifically included, the techniques described in other fields and the principles upon which the training schemes are based bore a close relationship to those with which gas officers are familiar.

In this country, said Mr. F. Bray, an Under-Secretary at the Ministry of Education, there is no university providing a degree in management, nor is there any institution comparable with the Harvard School of Business Administration. Management training is not conducted at university level; it has hitherto been provided mainly in technical colleges (87 of which are today providing full-time or part-time courses), but it is now being taken up inside industry itself. The extent of provision is not fully known, for which reason the British Institute of Management is making a survey of what is being done.

Mr. Bray defined a manager as anyone who holds authority over others; but in England foremen are not included in the term as they are in the United States. The training problem, he said, was one of making students more knowledgeable in the principles underlying training; he admitted the value of what is learnt by experience. But management was not only an art; it was also a science. He deprecated reliance on experience alone as the way to become a good manager; it was letting people learn at the expense of others and was like letting a teacher learn his profession by putting him in front of his class.

Supervisory Training

Management training in the Post Office was in the air before the war, said Mr. P. H. Locke, Director of Personnel in the Post Office; they had had annual conferences of top weight officers with managerial grades below. But it was the war which produced the need for a major effort at rehabilitation among the 75,000 staff who had been away in the forces. Training had started, with generous support from the trade unions, among the rank and file.

But it was not long before they began supervisory training; and in 1949 they turned their attention to the managerial grades. Managers in the Post Office, Mr. Locke pointed out, serve in isolated conditions; there would be only one head postmaster and one telephone manager in each town.

After discussions with other bodies of experience—the Ministry of Education, the banks which had already done much in this direction, the Army, and the Administrative Staff College at Henley—the Post Office authorities decided to run a residential training centre at Clacton-on-Sea. Here they have seven courses a year, each of four weeks and with 36 students. The ultimate aim is to include all managerial staff. The tutorial staff are Post Office people—a commandant, three directors of studies, plus secretarial staff. The total cost is £15,000 a year.

Mr. Locke defined the aim of the scheme as to give managers a better appreciation of what was expected of them, a clearer picture of their place in the Post Office scheme of things, and the vital importance of staff management among their duties. The methods of teaching are those of the Administrative Staff College—*i.e.*, mainly study in syndicates.

N.C.B. Activities

The conditions in the coal industry call for wide and varied measures of training which were described by Mr. J. Macdonald, Director-General of the N.C.B. Welfare Department. The legacy inherited by the Board led the writers of the Reid Report to say: 'Unfortunately there is a serious dearth of mining engineers who possess the knowledge and experience necessary to undertake the far-reaching schemes of reorganisation which are essential.' Mr. Macdonald described some of the principal measures taken to remedy that deficiency. The first was the provision of 100 university scholarships each year, mostly in mining engineering, open both to men in the industry and to boys of school-leaving age. Another device, known as directed practical training, places promising workers in the industry, each under a supervisory officer of experience, where they are coached for managerial posts. A salary of £450-£550 a year is paid during training.

Training techniques in electricity were described by Mr. D. Cleghorn Thomson, Director of Welfare of the British Electricity Authority. The Authority, he said, used to the full the services of outside organisations, including technical colleges, universities, or the British Institute of Management; but it had its own system as well.

B.E.A. Methods

For power station superintendents, for example, there were week-end courses intended to familiarise them with their duties as chairmen of local advisory committees; special induction training was provided in the functions of the various departments; and, lastly, all newly-appointed superintendents spent a month at headquarters before taking up their posts.

The scheme to which Mr. Cleghorn Thomson devoted most attention was that for the middle managerial grades, of which there have been three up to the present time. In each course there are 18 students, selected from grades such as accountants, chief engineers or their assistants, secretaries, or establishment officers. They aimed at an equal ratio between engineering and non-engineering types; all who attended the course were regarded as potential promotees, but attendance did not give any guarantee of promotion.

Describing the organisation of the courses, Mr. Cleghorn Thomson said that there was a resident director, aided by a small team of specialists and a number of visitors, each authoritative in his own field. Tuition was conducted on the syndicate basis, at a rapid tempo. The projects overlapped and the work set was impossible to fulfil individually, so there must be devolution of duties and syndicates must learn to discard what might be some of their best work.

The great merit of conducting the course on a residential footing, Mr. Cleghorn Thomson maintained, was that it mixed together members of various occupations, taught them to realise the whole pattern of the organisation, and produced a balanced and co-operative outlook on human relations and general policy.

SCOTTISH ASSOCIATION

Spring Meeting in *Dunblane* April 9th

The Spring Meeting of the Scottish Association of Gas Managers was held in Dunblane Hotel Hydro, Perthshire, on April 9. The President, Mr. Athol W. Brown, Aberdeen, welcoming a large attendance, said that three years ago, under the Presidency of the late Mr. Fred Mitchell, they had met in the same hotel. At that time he was the Secretary of the Association and had had something to do with deciding the venue of the meeting. Its success on that occasion had decided him to have the Spring Meeting there again.

The President said he desired publicly to congratulate Mr. D. D. Burns, the Deputy Chairman of the Scottish Gas Board, on the honour recently conferred on him by the Queen, and to congratulate Mr. E. G. Smith, of Glasgow, on his recovery from a recent serious illness.

Late Members

Mr. **W. Kirk,** the Secretary, intimated that the Association had, since last year, lost by death Mr. J. W. Napier, who was an Honorary Member, Mr. W. Scott of Hamilton, and Mr. A. Hamilton, Glasgow, who had been an Extraordinary Member since 1933.

The **President** said that Mr. J. W. Napier, who died in December, was President of the Association in 1929, having joined it in 1896, and was elected an Honorary Member in 1942. Over a span of forty years Mr. Napier was an outstanding administrator and engineer in the gas industry. Endowed with tremendous energy, courage in thought and action, a strong personality and powers of leadership, he played a prominent part in the inauguration of the Scottish Gas Council and over many years held the position of Secretary of the Scottish Management Committee of the National Gas Council and of the Federation of Gas Employers. He was also Secretary of the Scottish Tar Board and the British Commercial Gas Association (Scotland).

His interest and influence covered all aspects of the industry and his contribution to its development was notable and of lasting benefit.

Mr. Brown also referred to the death of Mr. A. T. Morrison, who had been Chairman of the Scottish Gas Consultative Council.

Introducing the various members of the platform party, the President thanked Sir Andrew Clow for honouring them with his presence. He had on several occasions spent some time with Sir Andrew in the lone reaches of the North, and had been prompted more than once to think that he would only give his time when the object was informative and constructive. His frequent attendance at the Association meetings indicated that he found them of real value. Mr. J. T. Haynes, the President of the Institution, was no stranger to their meetings and obviously derived immense enjoyment from his visits to Scotland. It was indicative of the energy, enthusiasm and success which had attended his year in office that he had found time to make the long journey to Scotland on the eve of his own Annual Meeting. At the same time, he expressed to Dr. Braunholtz, Secretary of the Institution, a welcome which was no less sincere. Also with them was Mr. Keith L. Stock, Under-Secretary of the Gas Division of the Ministry of Fuel and Power, who was prevented by business commitments from attending two previous meetings and whose successful third attempt was something on which they congratulated him. The relaxation of controls on materials and transfer of responsibility for capital authorisations to the Gas Council and the area boards had, said the President, removed the Ministry from their immediate ken, but they remained appreciative of the co-operation and helpful interest of the officials at the Ministry. A welcome was also extended to Mr. J. L. Warrender, the Senior Scottish Officer of the Ministry of Fuel and Power, to Mr. Wm. MacLeod, Deputy Marketing Director of the National Coal Board, and to Lord Mathers and Mr. Murdoch, members of the Scottish Gas Board.

Mr. **J. T. Haynes,** conveyed the greetings of the Institution. He had a happy recollection of all that was being done north of the Border for the gas industry and appreciated the opportunity of visiting his colleagues there. Good Scotsmen had the habit of drifting south, and he would ask them to make the most of their President while they still had him.

Mr. **Keith L. Stock** said that one of the most important things for the Ministry was to have the opportunity of meeting gas engineers and their colleagues in the industry. The worst possible thing that could happen was for them to try to do their job at long range by correspondence. His colleagues and he found such meetings efficiently run and valuable to them when they were trying to do their own ordinary work. He had read one of the papers to be delivered that morning and thought that he might receive some answers to various problems in connection with national fuel policy.

Nominations for Council

The President intimated that the Council had nominated Mr. W. M. Gledhill (Stirling) for the office of Junior Vice-President and Mr. D. Beavis, Edinburgh, Mr. W. S. Johnston, Dundee, and Mr. G. E. H. Keillor, Airdrie, for inclusion in the ballot list.

Education and Training

Mr. **James Hall,** Chairman of the Scottish District Education Committee, then read his 'Notes on Education and Training'. Introducing him, the President said he was Lecturer in Gas Engineering (Manufacture) at the Royal Technical College, Glasgow, over a considerable period; a member of the Scottish District Committee (I.G.E.) Education Scheme for many years, and Chairman of the Committee since 1935. The syllabus of the course drawn up for the Royal Technical College, Glasgow, for the new Associate Membership Examination of the Institution was the first in the country to be approved and accepted by the Institution. Much of the credit for that achievement was due to Mr. Hall.

The paper will be abstracted in a later issue of the 'JOURNAL.'

This was followed by Mr. Athol Brown's Presidential Address, which, together with the vote of thanks proposed by Mr. Ford (Inverness) and seconded by Mr. Campbell (Paisley), was fully reported in last week's issue.

THE LUNCHEON

Mr. **W. MacLeod,** Deputy Marketing Director of the National Coal Board, Scottish Division, proposing 'The Gas Industry', said that after listening to some of the things said that morning he felt that Daniel in the lion's den had nothing on him! He felt that it was a privilege that the N.C.B. should be given that Toast to handle. He was proud to number among his friends many gas managers, with whom he had a closer association before nationalisation 'broke out'. Since vesting day, he had rather lost touch with them. His roots were in Skye and he was something of a romantic; and therefore he had been struck even by the sight of a gasholder in a village with houses tucked round about, reminding him of the mediaeval castle one sometimes saw abroad, with houses all round about. He could assure Mr. Beavis that the structure at Granton did

not come into that category. He had been told that ships were now steering their way home 'by gas or by God'. Deeply though he respected Sir Andrew Clow, Mr. Burns and their colleagues, the gas industry was, to the speaker, not the gas board but the gas managers. The whole structure of their nationalised industry was based on the gas managers, just as the structure of the N.C.B. was built on the colliery managers. Those at the top could do what they liked, but it was the manager who got the job done.

Shortage of Suitable Coking Coal

Both the gas industry and the coal industry had their triumphs and their troubles. He hoped that they would not put the blame for their troubles entirely on the colliery managers, because they too had their own worries. There was, for example, plenty of difficulty as far as labour was concerned. It was no pleasure to the colliery manager to send to a gas undertaking coals of which he was not proud and which the gas industry regarded as unsuitable. He was prepared to accept from the gas industry the statement that the coal industry had a long way to go before giving satisfaction. There was a shortage of suitable coking coal in Scotland. Sir Andrew Clow was already aware of some of the things they were trying to do to improve output; and it would improve in due course. Sir Andrew and Mr. Burns knew of the demand they had to meet and their difficulties in giving the gas industry what all of them regarded as suitable coal. The gas manager was no different today from what he was in pre-nationalisation days. He was as co-operative and helpful as ever, and, although unfortunately the coal industry had to give him sometimes coal that was not suitable, he made the best use of that coal in his endeavours to produce good gas. He had been interested to note, in the President's excellent address that morning, reference made to the possible use of certain coals for the production of reasonable coke and gas. He wished to acknowledge the helpful attitude of the Board when it had been found necessary to bring into Scotland a considerable tonnage of foreign coal at an astronomical price.

A Two-Fuel Industry?

Mr. MacLeod said there had been a good deal of discussion as to whether or not the gas industry should be a two-fuel one. Should it produce gas only, or gas and coke? It was not only in Scotland that there was a shortage of coking coal; there was also a shortage of good quality house coal. With a reduction in the quantity of large coal, it would be a difficult matter to supply the domestic consumer, and the housewife would have to be educated as far as the use of fuel was concerned. He was the original Chairman of the Coal Utilisation Council in Scotland, and he could assure them that there was a vast field for co-operation open to the N.C.B., the C.U.C. and the gas industry. The housewife could buy as much coke as she wanted, and the commodity was very suitable for the modern open fire. Added to that, there was a shortage of house coal, and yet the demand for gas coke was disappointing. He would suggest that here really was a field which they could all explore together. He was not sure that the creation of smokeless zones would automatically result in a demand for coke. He knew that in that matter the gas manager could be a great help. He was much respected in his own locality and people went to him for advice. If he could advise the public in connection with the burning of coke, he would be doing a service to the consumer, to the country and to the industry.

Don't Shuffle Complainers!

Mr. MacLeod said that, in connection with complaints regarding coke, he had been told that the gas manager's answer sometimes was that he could do nothing about it because he did not pick the material that was sent to him. Coal and gas personnel were employed allegedly by the public and it was undesirable that the public should be frustrated by being shuffled between one industry and another. When they had complaints of that nature, they were entitled to raise the matter with him. If they got an unsatisfactory wagon or consignment they should let the N.C.B. see it or give them some means of identifying the consignment. The N.C.B. would try to do something to help; and if restitution was the appropriate remedy, it would be made. But they should not send their coke customers to the N.C.B., because the latter were not parties to the contract. All of them had chronic complainers. Personally, until coal was nationalised, he did not know there were so many lonely people without friends. They did the best they could for people who complained, but with some of them the correspondence went on and on, and he was satisfied that they were lonely people determined to keep the correspondence going.

Mutual Obligation

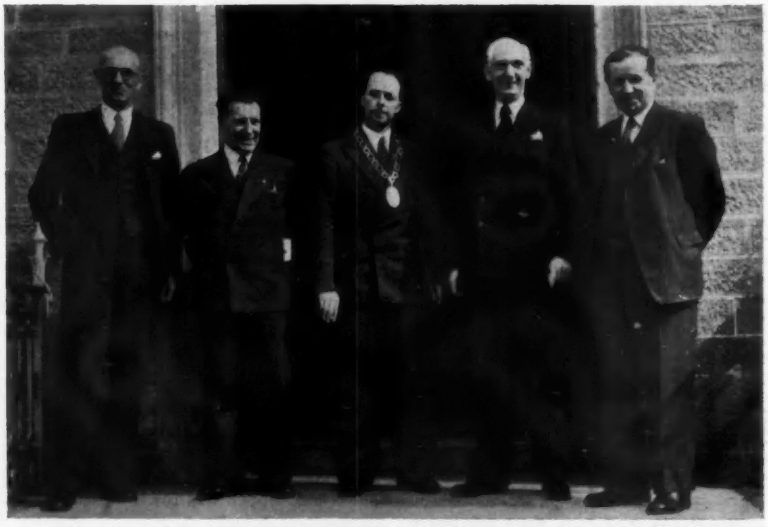
Mr. **J. T. Haynes**, replying to the Toast, said that in the gas industry they were intensely jealous of their rights and privileges, and Mr. MacLeod had played up to that fact in no uncertain fashion and had made them feel that he was kindly disposed to them. Some people, especially those in remote places, had to take whatever the N.C.B. gave them, and like it. Mr. MacLeod had given them a little talk, and they had liked it. Reference had been made to the gas manager. The gas manager was the same bloke today as he was five years ago. He had learned that especially during this last year. They were the same fellows as they were before, although they might be tied up by certain restrictions and legislation.

He brought them, that day, greetings from the Institution. He greatly appreciated the help given to the Institution by those north of the Border. The gas industry owed a great deal to Scotland. The founder of that industry, Wm. Murdoch, was a Scot, as was Sir David Milne-Watson, who also did so much for them. They owed much to the Scotsmen who had gone South and showed their colleagues how much could be done by virility and enterprise. At the same time, they owed much to England, the place where many Scotsmen went without buying a return ticket!

World-wide Regard for I.G.E.

The Institution was the technical side of the industry and was definitely the most democratic of all the organisations it contained. The Scottish Association had a representative on the Council—sometimes, indeed, two—and it was the thoughts and ideas of the individual managers and engineers which resulted in final decisions being made, based on the knowledge and the experience of all the gas managers and engineers in the country. For that reason, the Institution set a high standard and was highly regarded both in this country and all over the world. He had had twelve months experience in the Chair and as a result of that experience could say what he had said positively—the Institution was considered the premier professional body of the gas industry throughout the world.

Mr. Haynes said that the President had referred in his address to technical education sponsored by the Institution. The gas engineer was something more than a walking slide rule. Technical education was not the be-all and the end-all of the gas engineer. There was a reference in the paper to the Institution's technical scheme lasting for seven years. With day-release classes, it could be reduced to five years. But they knew perfectly well that during that period of seven or five years the young man was gaining experience and knowledge and soon was given a certain amount of responsibility. He might not be a gas engineer or a member of the Insti-



L to R.—*Dr. W. T. K. Braunholtz* (*Sec. I.G.E.*), *Wm. Kirk* (*Secretary*), *Athol W. Brown* (*President*), *J. T. Haynes* (*Pres. I.G.E.*), *Sir Andrew Clow* (*Chairman, Scottish Gas Board*).

GLENEAGLES

APRIL 8th

TOP RIGHT.—*J. H. Fulton (winner of the Cup), Wm. Ross, Chas. Mitchell.* MIDDLE LEFT.—*H. Q. Marris, J. Storrier, D. Rowan, R. G. M. Pratsie, W. Q. Foster.* RIGHT.—*Chas. Averill (Jr.), C. H. Angus, R. F. Bell.* BOTTOM LEFT.—*W. M. Gledhill, W. J. Crawford, H. S. Milne.* RIGHT.—*Athol W. Brown, D. D. Melvin (Captain of Circle).*

tution, but was playing a very useful part in their great industry long before he reached that stage.

Sell a Career in Gas

He wanted to make it clear that they should not turn down or prejudice young men going into the industry by suggesting that they had to put in seven years or five years training before becoming engineers. A young man might become a senior assistant and have considerable responsibility before passing his final examination, and even then he had to go on learning and learning until he retired from the industry. The training of a gas engineer took forty years, not seven years, but during his training period he was going up the scale and might ultimately reach the chairmanship of a gas board. The prospects were those of progressive responsibility throughout the course of his training. He wanted to make it clear that young men entering the industry had prospects there, better than those in any other industry in the country, whether it seemed a more glamorous profession or not. He would therefore support the President in his claim for greater publicity and greater salesmanship. They should get the public to realise that the gas industry was something well worth a young man's while.

Concluding, Mr. Haynes said that the gas industry as a whole, and their Association in Scotland in particular, were things of which they should be proud. The Scottish Association had a long history and indeed was older than the Institution itself. It was up to all its members to make the most of its tradition.

"The Guests" was proposed by Past-President, Mr. **E. G. Smith,** Glasgow, who said that every year at their Spring Meeting the Association had, as its guests, men distinguished in public life and industry. That day they had representatives of the Ministry of Fuel and Power, the Gas Board and the Institution, and he was in a difficulty as to who should receive first priority. He would address himself, first of all, to Mr. MacLeod of the N.C.B. Someone said that he was a brave man to come among them. But that was not so. They wanted to praise him, not to bury him, and the last thing his colleagues would want him to do was to heap stones on his head! It was fitting that they should have a representative from the coal industry, to which, at the end of every month, they owed so much! Mr. MacLeod had been originally with the Fife Coal Board, then had moved to Ayrshire and again had transferred to Edinburgh. Each move had been dictated, not by the desire for financial gain or power, but by his anxiety to handle a better quality of product. He had achieved his ambition and now hs was controlling the export market!

Mr. **K. L. Stock** acknowledged the toast briefly and thereafter, in proposing the health of the Chairman, Mr. **H. A. Aitken,** formerly of Buckhaven and Leven, said that in his early years Mr. Brown had been his Chief Assistant in Leven, where he had taken note of his ability and personality.

THE GOLF CIRCLE

Members of the Golf Circle took part in a competition for the Winson Scott Cup over the Kings Course, Gleneagles, on Thursday, April 8. Despite the glorious weather, which made golfing conditions ideal on this beautiful course, scoring was very high. The Cup was won by Mr. J. H. Fulton (Kirkcaldy), who had already won the Cup on two previous occasions.

Winson Scott Cup.—J. H. Fulton, 83−6=77.

Section I (handicaps up to and including 12).—Second prize, T. Roberston, 86−7=79; third prize, T. H. Johnson, 81−1=80.

Section II (handicaps over 12).—First and second prize (tie), E. Aspinal, 94−13=81, A. McFadyen, 96−15=81; third prize, H. S. Milne, 103−18=85.

Visitors.—First prize, W. T. Wright, 86−11=75; second, D. Harrison, 91−15=76; third, T. Grieve, 90−11=79.

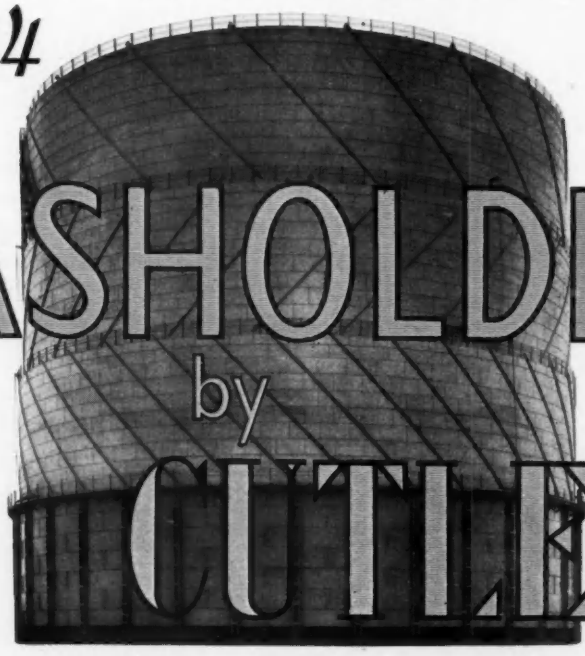
At a meeting in the Clubhouse afterwards, the prizes were presented by the Captain of the Circle, Mr. L. GARDNER, who also extended a welcome to the visitors. Mr. Gardner referred with regret to the absence of one of their members, Mr. David Fulton, and said this was the first outing he had missed for over 25 years.

MR. C. T. BAKER CARR returned thanks on behalf of the visitors.

MR. GARDNER expressed the thanks of the Circle to Mr. Gordon, of the Gleneagles Clubhouse, and his staff for the excellent catering arrangements. He also thanked the Hon. Secretary of the Golf Circle, Mr. W. P. Rae, and also Mr. Couper for the work they had put in behind the scenes which had resulted in a most enjoyable day for all.

MR. D. MELVIN proposed a vote of thanks to the Captain and Committee of the Circle.

Since 1844



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Radiation Introduce the S4183 Cooker

The New World S.4180 Cooker was introduced in 1949 to fill the need for an inexpensive gas cooker in the 'popular' class. It proved highly successful and approximately three-quarters of a million have been sold.

Radiation Ltd. now introduce a further development of this cooker—the New World S.4183—which in addition to the well-tried features of the original has many desirable refinements, including full width oven door, forward-venting oven flue, more attractive hotplate and pan support design, and an entirely new external finish of Radiation stain-resisting textured vitreous enamel. The S.4183 is of compact lay-out with hotplate, grill and oven one above the other in a single cabinet, completely enclosed in smooth-contoured panels which give the cooker simple and pleasing lines.

The structure of the cooker is of composite form based on the cast front frame of the oven. At the bottom of the front frame a chassis of angle section material is attached; this chassis includes a trucking bar at the back and extends downwards at the four corners of the cooker, to form strong points for fixing the vitreous-enamelled cast-iron legs. At the top of the oven front frame, angle-section members are secured and these extend upward and backward to form the foundation of the hotplate assembly. The main structure of the cooker is completed by the gas rail at the front and by a backplate bolted to the top angle pieces and to the chassis.

The oven is a sealed unit, built up from flanged panels bolted together and secured to the cast front frame with all joints cemented; it is also anchored to the chassis near the back and this contributes to the rigidity of the whole structure. The hotplate is built on the top angle members, the gas rail and a burner support casting at the back. The burners rest on the tap outlets at the front and on the casting at the back.

The overall dimensions of the cooker are:—

Height: To hotplate top, 36½ in.; to top of platerack, 53¾ in.

Width: With gas match, 23¾ in.; without gas match, 22⅝ in.

Depth (including door knob): 24 in.

Door opening: Width, 18 in.; height, 16 in.

Oven depth: Front to back, 14 in.

Hotplate Layout

There are four boiling burners and a covered centre-burner grill. The ratings are:—

	B.Th.U./hr.
Front left Rado burner	7,000-8,000
Rear Rado burners ...	9,000-10,000
Front right ring burner	11,000-12,000
Grill burner	13,000-14,000

The hotplate top is a single rigid steel pressing; it is smoothly-contoured and vitreous-enamelled all over, and is reversible back to front so that replacement after cleaning is very simple; it can be stabilised by using the adjustable supports on which it rests at the corners. The slot in the centre of the hotplate and the vent in the grill cover beneath allow grill combustion products to escape freely. The vitreous-enamelled cast-iron pan supports fit together in pairs and are located in recesses in the hotplate top; the individual pan supports are identical and interchangeable. The loops over the burner heads form a stable support for even the smallest pans. For ease of cleaning, the contours of both pan support and hotplate top have been kept as simple as possible consistent with satisfactory technical requirements. Taps are of the safety type, having spring-loaded knobs which have to be pushed in before turning on, and which are mounted on the front of the cooker where they are easy to see and to use. The hotplate is lined with panels shaped to guide spillage into the fixed crown tray beneath.

Details of Oven Construction

The wide oven is of ample capacity and has rounded corners for easy cleaning. The tap handle falls into the locked position when turned off. The oven has Regulo control, a single back burner (rating 11,000-12,000 B.Th.U./hr.) and a spring-sealed oven door which helps to conserve heat and to ensure the highest standard of cooking quality. The oven is insulated by 'Fibreglass' and aluminium foil, a combination having low heat capacity and high insulating quality. The oven grids are finished with chromium plate on nickel.

The cast-iron oven front is vitreous-enamelled. The oven door covers the full width of the front of the cooker and the hinges are almost completely hidden when the door is closed. There is a flanged inner panel to which hinges, latch, sealing strips and outer panel are attached. The door, like the oven, is insulated by 'Fibreglass' and aluminium foil, and the smoothly curved outer panel is secured by two hidden screws. The latch is of the well-tried cam type with handle of new design. The hinges are adjustable after removing the left side panel of the cooker.

The cooker is completed by a platerack assembly carried on two vertical supports fixed to the top back of the cooker. The oven flue products are vented forward beneath the platerack to avoid staining the wall and to make some use of their heat for warming plates. The platerack fits into the tops of the supports and is easily lifted out for cleaning; it has a vitreous-enamelled pressed steel top member with other parts in aluminium alloy. A vitreous-enamelled splashback fits on to the supports and is easily lifted off for cleaning. The oven flue extension, which is removable, discharges through an aperture in the middle of the splashback, covered by a removable vitreous-enamelled outlet grid.

Three Books of Statistics

Three important collections of statistics relating to the year 1952-53 have just been published by the Institute of Municipal Treasurers and Accountants. Two of them—*Education Statistics* and *Fire Service Statistics*—are issued by the Institute in conjunction with the Society of County Treasurers. The third is *Housing Statistics*, relating to over 500 authorities in England and Wales.

The first booklet (3s., post free) relates to the education services provided by all local authorities in England and Wales, and includes general education statistics, financial statistics, an analysis of costs per pupil, and an analysis of the costs of school dinners. Totals and averages for 1952-53 and the preceding year for each group of authorities are shown, together with totals and averages for all authorities.

The second booklet (3s., post free) contains statistics showing the strength of the fire force and the relevant expenditure for the year for each responsible local authority in England and Wales. The booklet is arranged in sections according to type of authority (county boroughs, joint authorities, London, English counties and Welsh counties). In addition to statistics of population and area there are particulars of the number of fire stations, the number of various kinds of appliances and the number of firemen for each authority. There is also a column showing the number of calls received during the year (excluding chimney fires and false alarms).

Housing Statistics (7s. 6d., post free) includes the number of dwellings in housing revenue account, showing separately those completed during the year 1952-53; the capital cost of typical houses completed during the year, showing in respect of both two and three bedroom houses the total cost divided between land, services, and construction. A summary of the housing repairs account, showing the average contribution to the repairs fund on pre-war and post-war houses; a summary of the housing revenue account, including the amount of the total rate subsidy per dwelling, and details of weekly net rents charged at March 31, 1953, for two bedroom and three bedroom houses separately showing averages for pre-war and post-war.

ANOTHER STEP FORWARD

A worthy successor to the S.4180, of which over three quarters of a million have been sold in 5 years, the S.4183 has a much improved appearance and many desirable refinements. The more notable of them are full width oven door, forward venting oven flue, attractive hotplate and platerack design, and an entirely new external finish of textured vitreous enamel.

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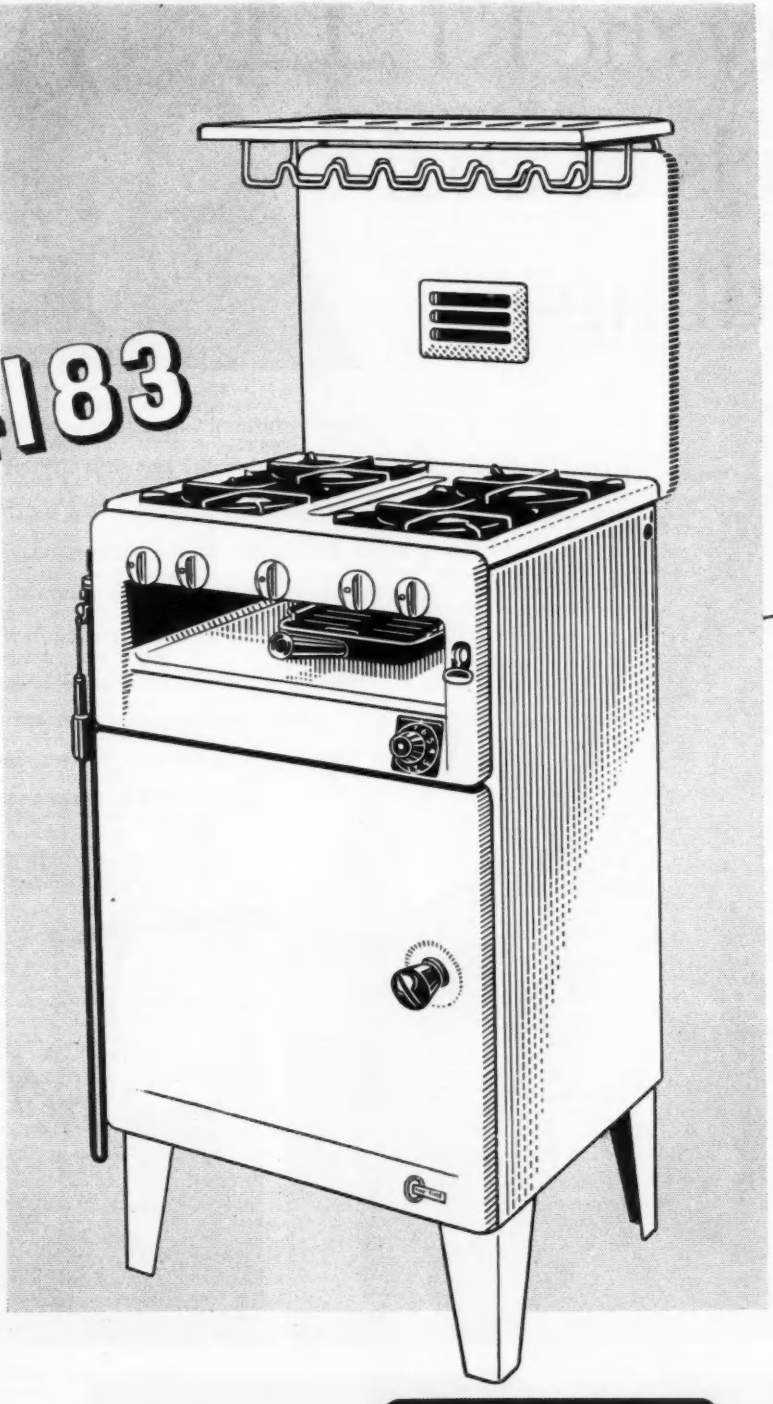

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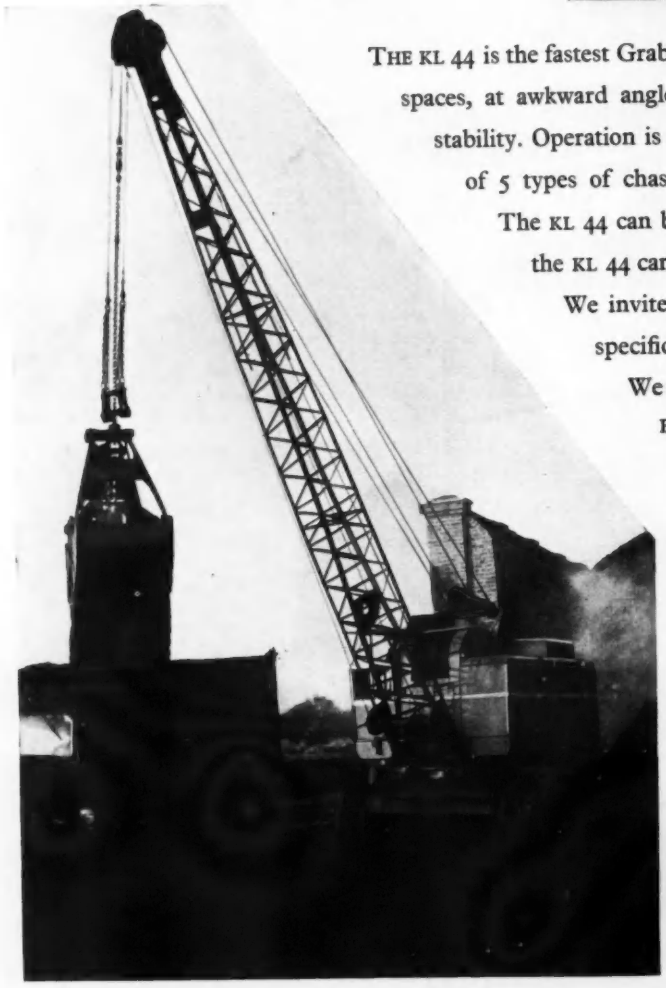

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Illustrations show a KL44, feeding hopper and truck straight from stockpile. A different type unloads a rail wagon.

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DISTRIBUTION ENGINEERING

The following is a report of the discussion on the paper by G. E. Haddon presented at a meeting of the North of England Section of the Institution of Gas Engineers in Durham.

Mr. G. W. Perks commented that the author was obviously a strong advocate of mechanical equipment in mainlaying operations. He (the speaker) was to an extent in agreement, but he would stress the necessity for careful planning and organisation to ensure the best use of such equipment. And he considered that the employment of mechanical plant could become a fetish. This applied particularly to busy thoroughfares, where the presence of other services and the short length of open trench possible severely restricted the speed at which pipes could be laid. They might reach the stage when mainlayers would even forget how to use sheer legs. Mr. Perks said he would like Mr. Haddon's view on the time reasonably to allow before permanent re-instatement was carried out. The Street Works Act was obscure on this point, and some local authorities extended the period inordinately.

Mr. Haddon, replying to Mr. Perks, said that proper application of mechanical plant in gas distribution work would result in reduced costs and higher efficiency. Delay by highway authorities in carrying out permanent reinstatement of road and footpath excavation work was often a matter of concern. The Street Works Act did not help in this regard. Everything depended on co-operation.

Asbestos Cement Pipes

Mr. W. McCough (Middlesbrough) commented that asbestos cement pipes were suitable for laying in moist ground and for the transmission of moist gas. The pipes tended to become porous when they were in dry conditions. They would therefore be useless for the transmission of dry gas if the pipes were laid in dry ground. The speaker went on to remark that a trench must be opened up far enough ahead to find out what obstructions lay in the path. A short trench would definitely lead to the use of many special castings, which, besides being costly, were not easy to obtain. The use of trench plates, duck boards, and trench struts could cancel all objections.

He maintained that it was essential to backfill between the joints. This gave rigidity to the main—and when laying flexible joints they required all possible rigidity. Once movement started on the length of main under test, there was no knowing when or where it would end. He admitted that struts could be used, but the person responsible for the test had enough on his mind without worrying whether the struts were or were not holding. The use of ethyl mercaptan quickly pinpointed a leak. The smell of ethyl mercaptan would penetrate any type of backfilling. Also, should an accident occur in testing, the presence of backfilling would to some extent deaden the force of the explosion.

He considered the water test to be impracticable. If a trench was filled with water a main laid with flexible joints would float to the top in the form of an arc. The author had suggested that a 24-hour test was a waste of time and money. He did not agree. On two occasions while testing a 24-in. main he found that the main was bottle-tight for 23 hours, but a leak developed during the last hour. On each occasion they found a leaking joint at a special. The spigots had been thoroughly brushed before jointing, but it was found that a small piece of scale had adhered to the pipe. This was due to the fact that the scale was covered with protective lacquer. However, he was in agreement with Mr. Haddon's suggestion regarding hydraulic tests. It would be safer, but certain factors had to be taken into account—*e.g.*:—

(1) Test lengths on large mains would have to be short owing to the amount of water used.

(2) Difficulty would be encountered in transferring water from one test section to the other, especially if the section which had just been tested contained syphons.

Trenching machines were very good but required keen supervision. When passing through fields they would tear out land drains and seal open ends. Farmers could very rarely tell where the land drains were, but six months after the site had been left they were claiming compensation for a flooded field.

Mr. Haddon, in reply, said that, with good site conditions, the life of asbestos pipe should not be curtailed. As to the testing of pipes, if a length of main was adequately anchored or strutted at each stop end or cap end at both ends and across the pipe and trench width, then movement was virtually impossible. In regard to the water test, it was correct to suggest that under certain conditions, due to the buoyancy of the air-filled main, the pipeline might float or lift. It was a searching test, and means whereby the pipeline might be safely anchored was a matter of detail.

Ideal Material for Mains

Mr. F. Fryer (Darlington) suggested that cast iron, steel, or asbestos cement did not form the ideal material from which mains systems should be constructed. A thin steel tube coated both internally and externally with suitable concrete by the modern spun process could show improvement on any of the existing materials mentioned. The technique would involve different jointing and service attachment methods; but this should not present too much difficulty if they used welding. He believed the best machine for most normal mainlaying work was the human one—*e.g.*, the good Irish navvy. In those situations where mechanical plant could be fully utilised, then plant hire firms offered the best facilities for its economic employment. Usual practice was to lay pipes with sockets upwards from lower to higher levels. This was largely why they used double socket syphons.

He considered the rate of mainlaying good, representing 13 pipes per day, although the amount of hand and mechanical strength employed would have completed the picture. On a 15-in. coke oven main they installed in 1950 by outside contractors, they attained the laying rate of 1,600 yards per week for some weeks. The size and comparative strength of these 18-in. pipes had a bearing on the faulty pipes encountered. The author advocated that reduced costs of laying were obtained by using narrow and shallow trenches, though he countered this by stating that portions of the main had 12 ft. and 13 ft. cover. He (the speaker) would have endeavoured to avoid this depth, having in mind the possible necessity to examine, alter, or repair the main.

Mr. Haddon, considering his reference to a short stretch of mainlaying as averaging 13 ft. of cover, said this work was in controlled land and had regard to the future level of this section of highway under a future road improvement scheme. The co-operation of a county highway authority was acknowledged of value on this particular scheme.

Mr. W. R. Garrett (Newcastle) pointed out that the British Standards Institution tried to meet requirements of all users. He agreed with the internal coating of pipes, provided benzole stripping was practised. In regard to cathodic protection, sacrificial anodes in the ground were giving place to impressed current methods. On a rough estimate, the cost of a trencher being £3,700, its whole value could be saved in the £150,000 Fishburn main alone.

Mr. Haddon said that the employment of the trencher was a wise decision confirmed by the machine's performance.

Problem of Occupied 'Condemned' Property

Mr. K. E. Brown (Newcastle) commented that it was not easy to determine when they should renew their mains. In the first place cast iron mains—and nearly all their mains were cast iron—were estimated to have a life of 70 to 80 years. In fact, many of their mains were older than this; and probably a life of 100 years for large diameter trunk mains would not be unreasonable. They were faced, however, with an immediate problem. While their mains had a life of, say, 70 years, the houses which they served were standing for 100 years, so that if they renewed the main in its normal sequence, the main might become redundant in 30 years' time. They knew, too, from their experience, that redevelopment of an area following the clearance of old property followed very different lines from the original layout, so that the mains which they had renewed would no longer serve the property when it was renewed in its turn. There was a further complication. Houses which were due for demolition in 1939 were still occupied. For these condemned houses there was obviously no immediate programme of replacement.

An equally difficult position arose where they had contemplated renewing mains in 1939 in areas where property appeared to have a further useful life which would justify the expenditure. There had now been a gap of 15 years, with a consequent shortening of the useful remaining life of this property. The property might still be good, but instead of

having 30, maybe 40, useful years ahead, in 15 years the question of rebuilding might arise.

Mr. Haddon, in reply, said that the question of possible renewals of cast-iron mains laid many years ago was complicated, as Mr. Brown had suggested. Often, streets of terraced property were fed from one main laid in the road with cross services taken from it. Small mains would require attention first, due to natural weakness and probable internal blockage. Larger mains must, he thought, continue in service until there was a definite indication of metal fatigue, and deterioration forced the issue.

Use of Plastic Materials

Mr. B. Richardson (Newcastle) remarked that, in speculating on possible future trends in gas distribution the author was of the opinion that iron was not likely to be ousted by other metals or substances for the construction of mains and services for some considerable time. Iron, of course, was a 'shy' metal, and once obtained in the elemental condition immediately endeavoured by every means in its power to revert to the state of oxide. Modern coal gas helped it to do this to a much greater extent than did the gas manufactured some 60 years ago when, with lime purification, its carbon dioxide content was reduced to a mere trace and (if old analyses were to be believed) the oxygen was rarely in excess of 0.2%. Following on the use of iron oxide in the purifiers, and the adoption of the so-called 'revivification *in situ*,' gas today was distributed with up to 1% of oxygen and anything from 1.5% to 3% of carbon dioxide, besides being more or less saturated with water vapour.

It had many times been stated that the relative immunity from mains corrosion in the past was due to the deposition of a protective film of condensed hydrocarbon oils on the interior surface of the metal, but he had never been able to accept this, because the vapour pressure of condensible oils in coal gas, even when lime purification held sway, was well below that requisite for saturation; and it seemed unlikely for any appreciable quantities to have separated out in liquid form over the temperature range prevailing in the main. He would suggest, therefore, that the cause was the absence of oxygen and carbon dioxide.

This being so, was there, or was there not, a case for coating the interiors and exteriors of gas service mains with a thin layer of a plastic material, or even in some circumstances for using mains fabricated entirely in plastic? He knew that thermoplastic vinyl derivatives such as mipolam were being used for pipelines conveying corrosive liquids, but he could not say whether they would or would not be effective by any particular constituent met with in town gas.

There was also the question of price to be considered. The price of plastics was not as stable as that of metals. But the production of plastics was continually increasing. Though at present they cost anything from six to 10 times as much as steel, it was quite possible that in future this gap would tend to close. It certainly behoved the gas industry to keep an eye on their potentialities.

METER MANUFACTURE

During a visit of the Yorkshire Junior Gas Association on April 7 to the works of Metropolitan Gas Meters, Ltd., at Nottingham, Mr. **S. Harrison,** B.E.M., introduced a discussion on 'Meter Manufacture.' He dealt *seriatim* with the assembly and machining of parts of the S.H.C. 100 cu.ft. closed-top prepayment meter, the 'finishing' operation, and the bench-testing of meters.

Mr. **A. J. Winter** (Leeds) said that he had been surprised to see that plastic valves were in production and to learn that they had been in use for some time. He asked if they were as satisfactory as the tin-alloy type. He asked why the meter manufacturers used paint which was decorative but which would not withstand weather conditions.

Mr. **Harrison,** replying, said that they had experimented with the plastic type of valve for over seven years before going into production. Since 1950 they had been using plastic valves with considerable confidence and with good results. They had had less trouble with sticking covers.

Mr. **Adcock,** also in reply to Mr. Winter, said that the paint used by the meter manufacturers was in accordance with B.S. Specifications agreed by the Gas Council. He suggested that meters should be placed in more suitable places, not exposed to the weather, and added that one particular area specified a white lead undercoat in addition to the decorative top coat. The additional cost was small and he would be pleased to see all areas specifying likewise.

Mr. **Smith** enquired about the speed factor allowance in testing meters.

Mr. **Harrison** said that they aimed at within 1% either way. He gave details of the the regulations laid down by the Board of Trade, and explained the test procedure of the examiners.

Mr. **Adcock,** replying to a question on the use of reinforced plastic diaphragms, told of a visit he had paid to the United States of America and of his inspection of gasworks and meter manufacturers works there. Synthetic rubber diaphragms were used in America and had been for some years. Experience there had shown that leather diaphrams could not stand up to the natural gas and propane as well as the synthetic rubber type of diaphragm. He stressed that in the United Kingdom there were more stringent tests in operation, and he doubted if the synthetic rubber diaphragms would satisfy these tests. He mentioned in particular oscillation and absorption factors.

Mr. **A. Cole** (Senior Vice-President of the Association) asked for information concerning the future of the die-cast meter and its likely cost.

Mr. **Adcock** doubted if die-cast meters would be cheaper that other types, but added that repairs could be carried out with unskilled labour. This, of course, was an advantage.

Mr. **Howarth** suggested that in the long run a die-cast meter would be cheaper because it would not suffer from corrosion. Moreover, it overcame the painting defects instanced by Mr. Winter.

Mr. **Adcock** agreed, but pointed out that, as far as initial outlay was concerned, there would be little or no saving.

CASTLETOWN GAS CENTENARY

The Castletown Gas Company has just celebrated its centenary. But this Isle of Man Company was conceived nearly seven years before its actual formation, when on October 9, 1847, a meeting of the inhabitants of Castletown was called in the Court House.

John Kelly, the High Bailiff, was in the chair, and it was resolved that 'it is desirable and expedient that a company be formed for the purpose of lighting the town with gas, and a provisional committee of 14 be appointed to obtain such information as may be necessary.'

Six years later, 1853, a meeting under the chairmanship of F. L. Gelling considered share capital and a list of shareholders. Later, with John Quayle in the chair, it was decided to apply for an act of Incorporation, and contact was made with the Provincial and Continental Gas Consumers Company London, who, if a plan of the town were furnished, would submit without cost plans and tenders for the works.

The first board of directors comprised: James Burman, J. M. Jeffcote, James Gell, J. M. McMeiken and D. F. Wilby, with Mr. Gell as treasurer and James Kewley as secretary. Mr. T. G. Barlow, first Editor of the 'GAS JOURNAL,' or as it was then 'JOURNAL OF GAS LIGHTING,' was appointed to act as consulting engineer at a fee of 20 guineas.

Then came the great day. On August 1, 1854, gas was laid on to the town. In December, 1858, although borrowing money for continual extension a dividend of 3% was declared. Later in the century dividends of 10-12% were allocated to shareholders.

Shortly after this there is on record the fact that a deputation led by one James Mylchreest was unsuccessful in requesting a decrease in the price of gas from 7s. 6d. to 6s. per 1,000 cu.ft. But in 1874 the price of gas had fallen to 4s. 9d. per 1,000 cu.ft.

A new telescopic gasholder in 1898 is still in use, but in 1904 the whole works had a structural and capital overhaul. New capital and debenture bonds had to be issued to cover a new holder, coal bay, scrubber tower, purifying beds and exhauster house. Later extensions carried mains to outlying regions of Ballasalla and Derbyhaven.

At the beginning of this century a reported presence of the smell of ammonia from drains and sewers, with threats of litigation if the nuisance was not abated, resulted in an expensive sulphate of ammonia plant being installed.

BOTTLED GAS FOR ORKNEY GROUP

Westray will be the first island in the Orkney group to benefit from a new scheme to supply light and power through cylinder gas. Distribution, which was launched on April 14-15, is being inaugurated by the North of Scotland Hydro-Electric Board and Calor Gas (Scotland), Ltd. The gas will be available in Westray at the same price as on the Orkney mainland, consumers being relieved of any freight charges. The Hydro Board is using this scheme to take modern amenities to remote places until it is ready to supply electric power.

GAS CALORIFIC VALUE CONTROL

FROM A PAPER TO THE SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT) ON APRIL 10, 1954, BY

G. C. FARMER,

Assoc.M.Inst.Gas E., A.M.Inst.F., Application Engineer, George Kent, Ltd.

Accurate mixture control producing gas of constant combustion characteristics is obviously desirable if it can produce an improved finished product for the gas consumer. Most large gasworks in this country have relied on a combination of holder capacity and staggered charging to obtain a steady value. However, on smaller works and at stations where holder capacity has become limited, closer control of calorific value of gas being produced has had to be kept. The increasing purchase of gas from coke oven plants, in conjunction with gas grid distribution schemes and new types of peak load plant, has in recent years caused gas mixing to be considered an automatic control problem.

Many experiments with calorific value control have been carried out over a number of years, and some have attained a good measure of success. With a few exceptions they have been applied to very small works where infrequent charging of retorts required an addition of diluent to balance the acute rise in calorific value when fresh charges were made.

The basic principles adopted have remained almost unaltered. They follow what is known in modern control terminology as closed loop systems (Fig. 1). The apparatus consists of a calorimeter, a controlling mechanism, and a valve regulator. The calorimeter measures the value of the mixed gases while the controlling mechanism via the regulator makes adjustments to the mixture when the measured value differs from the value required.

Analysis of Measuring Instruments

For calorific value control, a continuously measuring calorimeter must be employed, and the characteristics of the calorimeter used will materially affect the results which can be obtained under any specific conditions. It is helpful, therefore, to examine in detail the problems of continuous calorific value measurement.

With all recording gas calorimeters there must be a period of time after a value change has taken place before the effects of this change show on the chart of the recorder. This period is referred to as the 'dead time' of the instrument. Clearly the longer the 'dead time' the more delay will occur before corrective action can take place. 'Dead time,' therefore, or, rather, the lack of 'dead time' is the greatest consideration when selecting a suitable calorimeter for automatic control. The 'dead time' of any instrument is the sum of a number of individual lags:—

(a) Volume of the sampling pipes.
(b) Volume of gas in oil governors.
(c) Heat exchange between burner and calorimeter.
(d) Heat transfer to the recording mechanism.

To analyse these characteristics, some experiments were carried out using two well-known recording calorimeters, one being a water-flow instrument and the other of an inferential metallic expansion type. Arrangements were made to feed either air or benzole vapour into the service pipe to both calorimeters. It was thus possible to introduce a step increase or decrease in calorific value of the gas being supplied to both instruments.

It was found that the 'dead time' was lower in the case of the metallic expansion instrument, but that equilibrium to the new conditions appeared more rapidly in the water-flow instrument.

It is fortunate that in practice step changes in calorific value are not common and that usually the trends of change which the controller is called upon to correct have a cycle time which is longer than the 'dead time.' If this were not so, control by any method would be impossible. Another factor which will influence the control problem is the rate of response of the instrument after 'dead time' when change commences.

The high response rate after 'dead time' is the worst condition for control. In the extreme case antiphase conditions can arise where the valve action is magnifying rather than correcting the disturbance. In calorific value measurement it is permissible to attenuate these peaks in value, for the capacity provided by mains and purification plant allows adequate mixing even before the gasholder is reached. For measurement it is the mean value over a period which is of primary interest. In practice the records of water-flow and metallic expansion calorimeters compare without showing any attenuation in the latter case.

The foregoing should not be confused with an assessment of the relative accuracy of water-flow and inferential calorimeters. The water-flow calorimeter, such as the Fairweather and Junkers instruments, with their facility for manual check testing and more complex construction, has clearly the opportunity for more fundamental accuracy. The direct expansion types such as Sigma and Cutler Hammer have been developed recently to provide stable records over extended periods.

Three-Term Controller

Modern automatic control mechanisms, all of which achieve the same ultimate results, may be divided into three main types by their operating media—*i.e.*, hydraulic, pneumatic, and electronic. In every case they are available in the three-term form. The advent of the three-term controller enabled a number of difficulties found in early experiments in calorific value control to be overcome. Quickly to comprehend the meaning and purpose of the three-term is not easy. The control terminology now adopted as a British Standard is still unfamiliar to many. The mathematical resolution of these control actions is

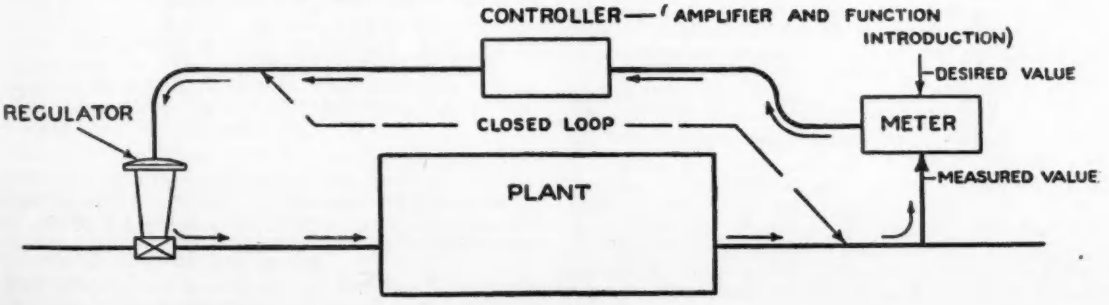


FIG. 1

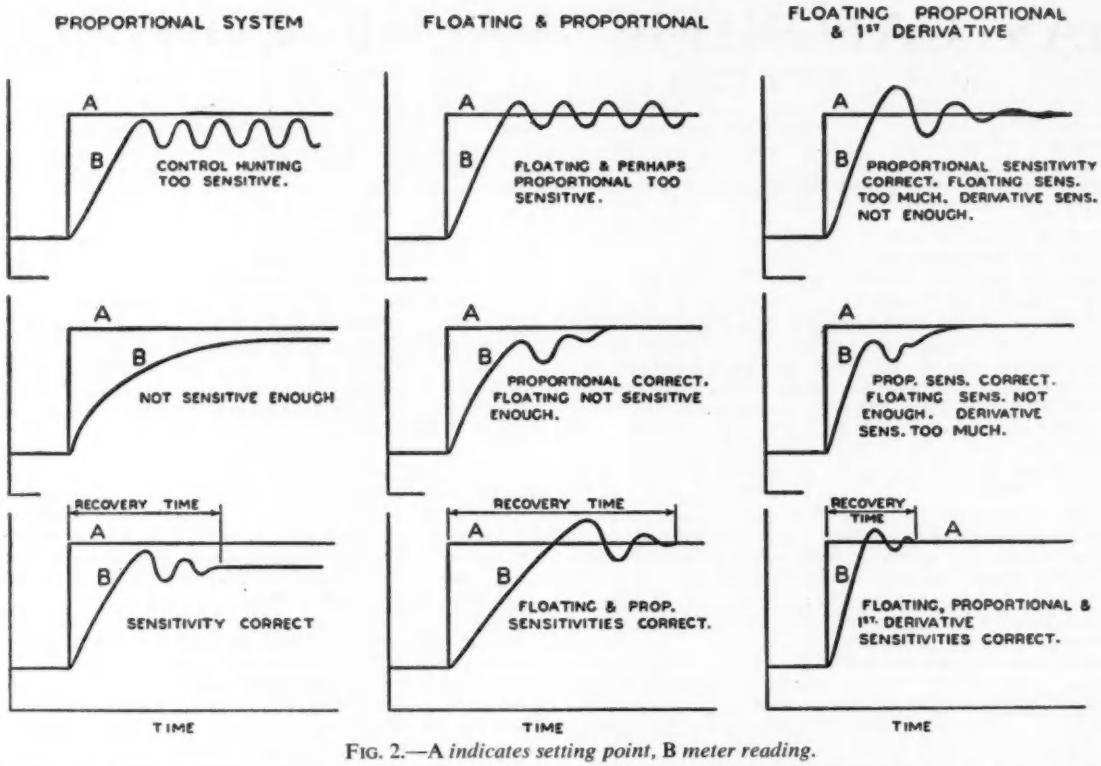

PROPORTIONAL SYSTEM
FLOATING & PROPORTIONAL
FLOATING PROPORTIONAL & 1ST DERIVATIVE
A
B
CONTROL HUNTING TOO SENSITIVE.
FLOATING & PERHAPS PROPORTIONAL TOO SENSITIVE.
PROPORTIONAL SENSITIVITY CORRECT. FLOATING SENS. TOO MUCH. DERIVATIVE SENS. NOT ENOUGH.
NOT SENSITIVE ENOUGH
PROPORTIONAL CORRECT. FLOATING NOT SENSITIVE ENOUGH.
PROP. SENS. CORRECT. FLOATING SENS. NOT ENOUGH. DERIVATIVE SENS. TOO MUCH.
RECOVERY TIME
SENSITIVITY CORRECT
FLOATING & PROP. SENSITIVITIES CORRECT.
FLOATING, PROPORTIONAL & 1ST. DERIVATIVE SENSITIVITIES CORRECT.
TIME

FIG. 2.—A *indicates setting point,* B *meter reading.*

reasonably straightforward, but their function in control schemes becomes clearer when the practical aspects of the problem are considered.

The actions refer to changes in valve position as a result of a deviation of the measuring instrument from a required value. Modern commercial controllers now use:—

(i) Proportional action alone.
(ii) Proportional + integral action.
(iii) Proportional + derivative action.
(iv) Proportional + integral + derivative action.

For calorific value control we are mainly interested in controllers containing the combination of all three forms.

Proportional Action.—Suppose an operator is employed to control the mixed gas value at 500 B.Th.U. and a disturbance has been introduced which has made the value rise to 505 B.Th.U. The operator will take action to make a valve change which is roughly proportional to this deviation of 5 B.Th.U. An automatic controller will make a similar proportional change. The constant of this proportional change, and hence the actual magnitude of valve position change, are determined by the proportional band width or sensitivity of the controller.

As a result of the proportional action, the diluent valve has been opened to allow more weak gas into the mixture to restore the high value to normal, and this valve will have opened an amount which is proportional to the deviation from the desired value. As the value returns to desired value the deviation will become less and the valve will tend to return to its original position. Eventually equilibrium will be reached and the recorded value will be near the desired value. The failure to reach the desired value with proportional control methods is termed 'droop' or 'offset.' Thus it may be seen that calorific value control with proportional action only cannot be completely satisfactory.

Integral Action.—Again, suppose the valve was controlled manually, the operator would see that steady conditions had been reached slightly above or below the desired value. He would then make a series of exploratory small changes to the valve position until the desired value was restored. The integral of these small changes is, therefore, the total corrective action required. Hence the term 'integral action.' In practice the rate at which this corrective action takes place is critical in matching the controller to the plant. The setting for this term is, therefore, measured in integral action time.

Derivative Action.—Continuing the assumption that the valve is being manually controlled, a sudden rapid increase shows itself in the recorder. The operator senses that an immediate and large change in dilution admission is necessary, and by experience he quickly re-positions the valve to meet the disturbance. Now an automatic controller cannot acquire experience, but it is relatively easy to measure the rate of change in the measured value and to match with this a valve movement, thus anticipating the final magnitude of change necessary. The valve is thus positioned by the time derivative of the deviation.

Summary

Proportional Action:

The valve position is proportional to the deviation from the control point. Expressed mathematically

$$P = K_1 E$$

where P = valve position
E = deviation
K_1 = sensitivity factor

Integral Action:

The rate of valve movement is proportional to the deviation. Expressed mathematically

$$P = K_2 \int E dt$$

where P = valve position
K_2 = integral sensitivity
E = deviation
t = time

Derivative Action:

The valve position is proportional to the rate of change of the deviation from the set point. Expressed mathematically the valve position is proportional to the first differential of the deviation

$$P = K_3 \frac{dE}{dt}$$

K_3 = derivative sensitivity

In a three term controller containing proportional, inte-

gral, and derivative actions, the valve movement will be proportional to the algebraic sum of all three effects

$$P = K_1E + K_2 \int Edt + K_3 \frac{dE}{dt}$$

In the foregoing description of automatic control actions, the effect of sensitivity has not been considered.

The accompanying graphs (Fig. 2) show the results of a combination of the terms and their effects at varying sensitivities. All three graphs under proportional system demonstrate offset or droop. It will be noticed that recovery time is shortened when derivative control is included. It should be remembered that in all cases the graphs show response to step functions and it has also been assumed that the plant characteristics require the use of a three-term controller. This will not always be the case with automatic control problems, but is nearly always so in the case of calorific value control.

Pneumatic Systems

There are two major requirements for an effective controller:—

(i) The ability to set easily the various control actions to the plant conditions.

(ii) The ability to alter the control point instantly at will without in any way affecting the control actions or the alignment of the controller.

The Kent Mark 20 pneumatic controller is made up of the following main components:—

(a) A flapper-nozzle resistance arrangement where various positions of the flapper above the air-fed nozzle will throw varying back pressure in the nozzle air supply.

(b) A relay unit which will amplify this small volume of air without changing its pressure.

(c) A spring bellows arrangement which can react on the flapper to restore its original position, the magnitude of reaction being a means of proportional band adjustment.

(d) An integral chamber containing a volume of air, the pressure of which will re-position the proportional bellows to remove offset.

(e) A differential U-frame device which enables the relative positions of the control and measuring pointers to locate the flapper with respect to the nozzle, regardless of desired value selection.

(f) Two adjustable needle valve resistors which control the sensitivity of the integral and derivative actions.

The flapper-nozzle system is an extremely sensitive method of detecting movement. Air is supplied to the nozzle through a capillary tube forming a resistance. When the flapper starts to impinge on this nozzle, the pressure will rise. Less than one thousandth of an inch of flapper movement is required to raise the pressure from zero to the maximum available. In practice a range of 3 to 15 lb. per sq. in. is normally used, and the relationship between flapper position and pressure through this range is reasonably linear.

This pressure generated by the flapper-nozzle resistance circuit is the basis of this pneumatic controller. It will be realised that the volume available within this circuit will be very small, and in order to use this pressure to actuate a control valve, an amplifying relay is used. Because of the sensitive nature of the flapper-nozzle system, some form of de-sensitisation must be employed. A feed-back of the air pressure in the nozzle circuit is made to the bellows unit so that the movement of the bellows mechanically returns the flapper almost to its original position. The extent of the re-positioning will depend on the position of a lever which shifts the fulcrum of the flapper link. In this way adjustment of the proportional band width is achieved.

This controller obtains integral action by passing the nozzle pressure via a resistance to the inside of the proportional bellows, which is termed the integral chamber. This influences the final position of the flapper. The practical effect of this is to continue air pressure change until the pointers are coincident.

Derivative action is achieved by including a resistance in the connection between the nozzle and the proportional bellows. This resistance delays the feed-back action, thus giving an initial boost change in pressure when rapid control errors occur.

For butterfly valves three main types of pneumatic valve regulator are employed: (i) Power cylinders; (ii) diaphragm heads; and (iii) diaphragm-type valve positioners. [At this stage of the paper the author described these three types.]

Early Systems

The Sigma gas pressure system uses pressure of purified gas to position a bell which in turn regulates the position of a butterfly valve in the diluent main. Fig. 3 shows that

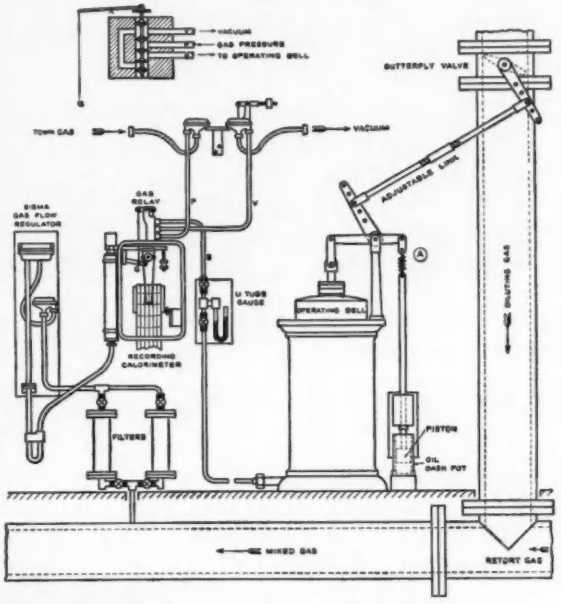


FIG. 3.—*Proportional control gas relay valve*

the actual controller is a gas relay, the valve of which is positioned by the measuring pen of the calorimeter. This valve is of the differential type so that the load imposed on the measuring instrument is constant at all positions of the relay. This relay allows gas to pass via the bell to the vacuum source, the valve position determining whether gas is entering or leaving the bell. Under steady value conditions equilibrium will be reached and the gas will pass directly to the vacuum source. This system has been successful on a number of small works.

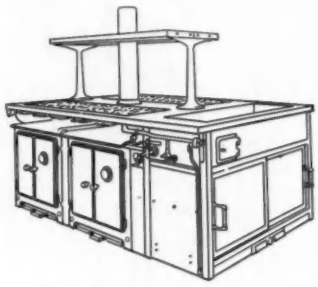
With this system there is no means of adjusting the point at which control is desired, and lining-up of the controller is somewhat difficult. However, due to the design of the relay the rate at which the operating bell moves will increase with increasing error. This is a form of derivative control. There is no doubt that this feature contributed to the success of the scheme.

(*To be continued*)

The British Standard for Calorimeter Thermometers (excluding gas calorimeter thermometers) was first published in 1938. It has now been revised and brought into line with other recent British Standards for thermometers. The range 9°C. to 33°C. is covered by seven thermometers, each having a range of 6°C., which are suitable for use in bomb calorimeters. The range 8°C. to 32°C. is covered by three thermometers, each having a range of 12°C., which are suitable for use in other types of calorimeter. The thermometers are of the mercury-in-glass, solid-stem type, and the usual details are given for materials, dimensions, constructional details, graduation, figuring, and permissible errors. Copies of the new standard (B.S. 791:1954) may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1: price 2s. 6d.

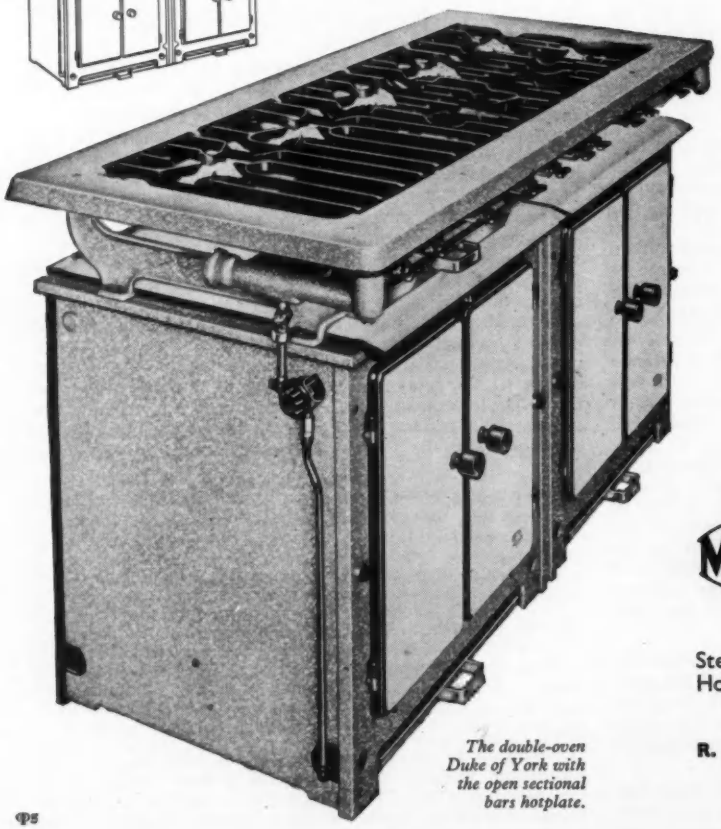
Gas Range that's got itself a name for reliable service in thousands of kitchens

This is the Main "Duke of York" Range . . . a great favourite with chefs and with an established reputation for highly efficient cooking properties and strong durable construction. It is available in various forms to satisfy all requirements. As a "wall" type, it can be had as a single oven, either in a 24″ or 35″ internal width, surmounted by a hotplate 41″ wide. Alternatively, any number of 24″ or 35″ ovens may be joined together in battery form, with a continuous hotplate over. The Duke of York can also be supplied as a "central" range with four, six or more ovens. Potracks can be fitted on both the wall and central range types and there is a choice of "open" sectional bars or "unit" hotplates.



A central range incorporating a Bain-Marie and hot-closet.

A double-oven range fitted with hot-closet and backplate.



The double-oven Duke of York with the open sectional bars hotplate.

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If you have a catering problem consult R. & A. Main Limited. Our organisation, backed by years of experience in planning and equipping kitchens of all sizes, will gladly work with you in developing your own ideas or submit plans for your kitchen.

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Φ5

New Midland Offices for Teddington Groups

To mark the opening of the Midland offices of the Teddington Group of Companies, executives and friends were invited to a luncheon party on March 31. The party gathered at the new offices. The address is: 107, Dale End, Birmingham 4. Telephone number, Central 4171-2.

Among the representatives from the industries which use Teddington instruments, were included Mr. W. E. Benton of Flavels, Mr. A. F. Oatley of Cannon (C.A.), Ltd., and Mr. E. J. Blumson, Allied Iron Founders. At the luncheon, Mr. Stephen S. Sherlock said the function of the new offices was to cover the interests of the Teddington clients, and to provide an effective technical and consultative service.

Mr. V. C. Miles, who will manage the new office, has represented the Group in the Midlands during the last five years. He began his career as an apprentice with the Gas Light and Coke Company.

Parkinson & Cowan

In pursuance of the plan to consolidate the activities of the Parkinson & Cowan Group of Companies, the electrical division of Measurement, Ltd., will be transferred on April 30 to Parkinson & Cowan, Ltd.—the parent company.

On the same date Aspec (London), Ltd., will be liquidated and will cease to trade as a separate limited company.

As from May 1, the electrical division and Aspec will be merged and will operate as a new division of Parkinson & Cowan, Ltd., under the title 'Parkinson & Cowan Instruments (Incorporating Aspec), a division of Parkinson & Cowan, Ltd.' This intimation concerns what is in essence a matter of internal re-organisation only, say the Parkinson & Cowan group.

West Midlands Presentations

Mr. F. C. Briggs, Divisional General Manager, Wolverhampton and District Division, West Midlands Gas Board, presented trophies to the Board's indoor sports winners at the Station Hotel, Dudley, on April 12. And then Mr. Briggs, who is due to retire shortly, was himself handed a cheque by his Deputy Divisional Manager, Mr. Stanley Jones.

Mr. Briggs heard himself described as 'an eminent figure in the industry and one whose name is held in high regard up and down the country.'

Thanking Mr. Jones, Mr. Briggs, who was accompanied by his wife, said he was proud of the high standard of efficiency of his Division, which could not have been achieved without the co-operation of every employee in the district.

Change of Address.—On April 29 the offices of Chemical Engineering Wiltons, Ltd., will be transferred to Cheadle Heath, Stockport, Cheshire (T/N: Gatley 5231; T/A: Wiltonstil, Stockport). All business will be conducted from that address.

Belfast Gas Prices Reduced

Belfast City Council has adopted a report from Mr. J. L. Hyslop, Manager of the Gas Department, in which he recommended a reduction of 4½d. per 1,000 cu.ft. on gas consumed in excess of 10,000 cu.ft. per quarter.

The Chairman of the Gas Committee, Councillor S. K. Henry, said there would be a further review of prices in the next few months.

Councillor Cranston said that while congratulating the Chairman and Committee on the reduction, he did not think it would affect many housewives, and he hoped there would be a speedy review of prices.

British Wood Preserving Association

As mentioned in our Personal column this week, Mr. Stanley Robinson was, at the annual general meeting of the Wood Preserving Association on April 21, elected President for 1954-55. Messrs. T. G. Robinson and C. S. White were elected Vice-Presidents and Mr. T. Brown Hon. Treasurer.

Among other elections were Messrs. L. W. Blundell (North Thames Gas Board), C. E. Carey (South Eastern Gas Board), L. A. Drapper, (South Western Tar Distillers), T. Knowles (Association of Tar Distillers), F. M. Potter (Scottish Tar Distillers, Ltd.), and J. B. Vickers (Yorkshire Tar Distillers), Ltd.).

News in Brief

The 21st Conference of the Advertising Association will be held at Bournemouth at the beginning of May. Among the speakers will be Sir Harold Smith, Chairman of the Gas Council.

National Smoke Abatement Society.—The telephone has now been installed at the Society's new offices, 30, Grosvenor Place, London, S.W.1. The number is SLOane 6301.

Mr. D. P. Welman, Chairman of the North Western Gas Board, has been invited to discuss with members of the North West Regional Board for Industry the success of the 'Rochdale' process and its likely effect on gas production in the region.

The British Welding Research Association has appointed Mr. A. G. Thompson to make an investigation into welding productivity. Mr. Thompson has been associated with the welding and metal fabricating industries for a number of years and has recently been engaged in investigations into product design and production problems with a group of companies in the heavy engineering industry.

Gem Brushes (Luson), Ltd.—As from May 1, A. Luson & Sons, Ltd., Park Royal, London, manufacturers of wire brushes since 1874, will be changed to Gem Brushes (Luson), Ltd. This change has been brought about because the trade name 'Gem' has become better known than the name of the company.

B.C.P.M.A.—The 34th annual general meeting of the British Chemical Plant Manufacturers' Association was held in London on April 13. Mr. W. J. Hooton was elected Chairman. The meeting was followed by a private dinner discussion meeting, when the subject was 'the threat to British engineering exports.'

The North Western Gas Board sold 1,609,500 tons of coke in the year ended March 28, 1954—an increase of 8.6% over the previous year. This compares with a rise of 2.8% in coke sales in the gas industry as a whole. Sales during March averaged 42,300 tons a week—an increase of 17.3% compared with March, 1953. It is the highest March figure since the Board was established.

D

Trade News

Dust Control

Rightly, more attention is being paid to the industrial dust hazard. We are therefore interested in information which we have received of the 'Dusgard' unit for control of dust from pedestal grinders. This is a one-piece unit comprising a mild-steel faceplate, complete with necessary slots, connected to an exhaust manifold at the back of the plate, from which two side screens extend back to the sides of a standard wheel guard. A circular spigot is provided for connection to the exhaust system. The 'Dusgard' is, we are informed, easily fitted without any major alteration to the grinder. Full particulars can be had from *Air Control Installations, Ltd., Ruislip, Middlesex.*

The 'Buildall' Tube Clamp

We have had demonstrated to us a most ingenious and simple clamp—the 'Buildall,' which should prove of considerable interest to the gas industry. It is a high tensile steel pressing in two similar halves which interlock in a foolproof manner and permit two tubes to be securely locked together at right-angles. A hardened grub screw is forced into the softer metal of the tube. Thus each clamp has great load-carrying capacity. Further, when a cross tube is employed, the clamp holding this can be placed directly against the clamp above; thereby double loading capacity is obtained. The 'Buildall' clamp, which appeals to us because of its essential simplicity and effectiveness, is at the moment made in one pattern only to suit 1 in. standard tube (1$\frac{5}{16}$ in. diameter approx.). This facilitates stocking; and whatever the job the right type of clamp is available. Temporary structures can, of course, be readily dismantled and the clamp used repeatedly. The 'Buildall' clamp was demonstrated to us by Mr. E. J. Spreadborough, 30, Heath Street, Hampstead, London, N.W.3 (Tel.: Hampstead 8037). The patentees and makers are the *Supplies & Service Construction Co., Ltd., Artillery Street, Heckmondwike, Yorks.*

Light Weight Fire Pump

We have received particulars of the Sigmund Rover 1S/60 ultra-light weight fire pump. For many years Sigmund hydraulic engineers have applied their efforts to the design of a fire pump which can give the fire fighter the essential qualities demanded by the urgency of the job—light weight, small bulk, easy and quick starting, fast priming, and dependability at all times.

The advances in gas turbine design and development by the Rover team of engineers have been brought together with Sigmund hydraulic experience to overcome major problems confronting the fire pump designer. It is claimed that, by combining the advantages of the latest Rover light-weight gas turbine with those of the Sigmund high-speed centrifugal pump, the new 1S/60 unit gives outstanding advantages.—*Sigmund Pumps, Ltd., Team Valley, Gateshead.*

Versatility of Small Loaders

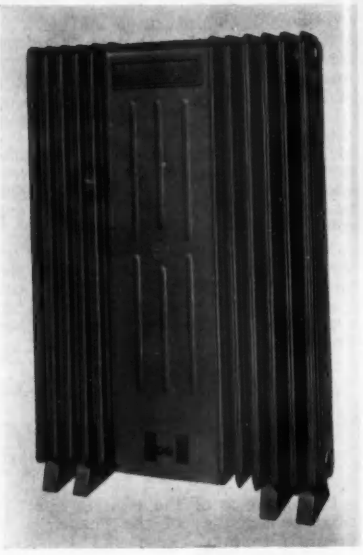
At the Pontefract works of the Hemsworth and United Kingdom Coke Oven Co., Ltd., the rate of removal of spent oxide from the cramped and restricted space below the purifier has been increased to a remarkable degree by the use of a Muir-Hill LH-1 diesel hydraulic loader. When not engaged in disposing of the spent material into a crusher, the loader feeds fresh oxide to the purifier elevator. The yearly total handled by this small loader is in the region of 5,000 tons.

Another application for this versatile machine has aroused interest among those who have seen the way in which a Muir-Hill LH-1 loader is operated by the Southern Gas Board at its Poole works. When colliers have almost completed discharging cargo the loader is lowered into the hold, where it trims the 300 to 400 tons of each 1,800 ton coal cargo requiring re-distribution from under the 'coamings.' This use of their Muir-Hill loader is described by the Southern Gas Board as effecting a considerable saving in man hours. In addition, the LH-1 is used for handling iron oxide at the works and regularly moves about 15 tons an hour, depending on the length of travel required.—*E. Boydell & Co., Ltd., Old Trafford, Manchester, 16.*

Re-distribution of cargo by Muir-Hill loader.

Oilfilled Gas Radiator

The accompanying photograph is of a new industrial type Hurseal oil-filled gas radiator. It is a fixed appliance and is finished in bronze stoved paint. The gas rate is 9,000 B.Th.U. per hour at C.V. 500. Construction is mainly welded sheet steel with a twin heat transfer coil connected to the upper and lower manifolds. Further details are: Height, 42 in.; width, 28$\frac{1}{4}$ in.; depth, 9$\frac{1}{2}$ in.; weight, 205 lb.—*Hurseal, Ltd., 229, Regent Street, London, W.1.*



Hurseal Oil-filled Gas Radiator.

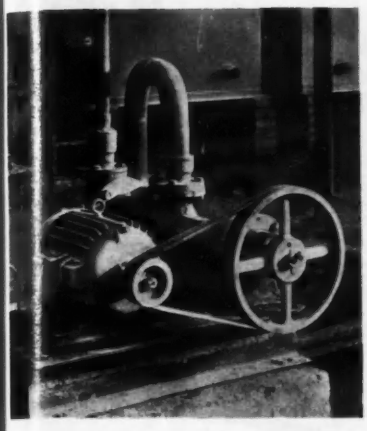
Motors for the Chemical Industry

The English Electric Co., Ltd., is now manufacturing a range of squirrel-cage induction motors specially designed for operation in the atmospheres found in installations such as chemical plants, plating shops, gasworks, coke oven plants, salt works, and oil refineries. The motors are made to British Standard dimensions and are available in outputs up to 25 H.P. Although similar in appearance to the normal English Electric class LY, totally enclosed, fan-cooled machines, these motors incorporate several unique features that resist the corrosion caused by excessive humidity, salt air, and sulphur dioxide fumes, etc.

A moulded plastic fan, mounted on the non-driving end of the shaft, cools the motor by blowing air along axial cooling fins cast integral with the motor frame. The fan is made from phenol formaldehyde, and durability and fatigue tests have been carried out to prove the suitability of this material and also the special method of fixing the fan on the shaft. After tens of thousands of stress reversals, simulating the severest conditions of duty that could be imposed on a motor, the fans have remained undamaged and secure.

Polyvinyl-acetal-covered wire is used for the stator winding. The windings are impregnated with phenolic insulating varnish by dipping and baking them four times in an automatic heat-controlled continuous oven. This process

has been found to produce a finished winding capable of high resistance to corrosive chemicals.



5 H.P. motor operating in the corrosive atmosphere of a chemical works.

Wherever possible, cast iron is used for components forming the external surfaces of the motors. The cowl over the fan is also made of cast iron instead of pressed steel, and all external surfaces of the stator and the fan cowl are finished with a special protective paint. The rating plate is made from polyvinyl chloride to ensure that it is not obliterated by corrosion.—*English Electric Co., Ltd., Stafford.*

P.V.C. Gloves

Maintaining their policy of providing a particular glove for every industrial hazard, James North & Sons, Ltd., announce a further addition to their range of industrial protective gloves. The new glove is the Red P.V.C. fabric supported lightweight type 725. This glove is fabric lined, has an exceptionally fine texture, and is claimed to have a much longer life than the industrial cotton and lightweight leather glove which it replaces. It is 11 in. long and is available in a range of hand sizes, having a gauntlet cuff which fits neatly over the wearers' sleeves.

Special features include an increased flexibility and sensitivity of touch, permitting the fast manipulation and assembly of small parts. The tough P.V.C. coating does not absorb oil and dirt, is easy to clean, and, we are informed, will not fray or burst at the lining seams.

The glove provides protection against abrasion, but, in view of the lightweight P.V.C. coating, it is not generally recommended for the handling of corrosive chemicals.—*James North & Sons, Ltd., Hyde, Cheshire.*

'Weatherill' Overloader

For a number of bulk handling jobs, an overhead loader represents the logical development of the now widely used front-end type of loading shovel. For this reason, F. E. Weatherill, Ltd., following considerable prototype work, have begun full-scale production of a hydraulic machine of this type.

An overhead loader is, of course, a specialised item of equipment which cannot have the same wide range of uses of the more universal front-end loader. However, where maximum output is important, the fast-working Weatherill hydraulic overloader is capable of four loading cycles per min. Depending on the material handled, this can in turn mean a relatively easy 100 tons or more per hour.

Operation is simplified. With reduced steering effort and fewer clutch and gear changes, there is saving in operator fatigue and mechanical wear and tear.

Technically, the Weatherill hydraulic overloader is an interesting machine in that the side arms are raised for the first part of their travel by a pair of main rams located on either side of the main frame towards the rear of the machine. At the extremity of their travel, a set of secondary rams take over and complete the overhead movement of the side arms and scoop. 'Crowding' action of the scoop when pulling through the material is embodied and is achieved by two further hydraulic rams mounted on the side arms. One movement of a single control lever is all that is necessary to complete the whole loading and discharge operation. This movement also incorporates a braking effect which automatically slows down the rate of movement of the side arms at the end of their travel just prior to the discharge of the load, which has the effect of assisting the satisfactory emptying of the scoop. The same control lever brings the scoop back to the loading position under hydraulic power.

Weatherill Loader.

A further point of interest from the safety point of view is that the side arms do not travel past the operator. Although the load itself must obviously pass overhead, the cab is specially reinforced to provide protection from involuntary spillage. Discharge height and reach are ample for loading high-sided trucks or wagons.

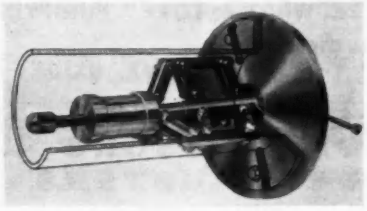
The machine is available with a ½ or 1 cu. yard scoop, to which digger teeth may be fitted if required. It is integrally built, using the Fordson industrial tractor for power and transmission, the four cylinder diesel engine giving 44 B.H.P. at 1,800 r.p.m.—*F. E. Weatherill, Ltd., Union Row, London, N.17.*

Twinner Pipe Flanging

A new tool has been designed to meet the problem of ensuring accurate squareness of 'slip-on' flanges to the bore of pipes when welded. It is also used for internally lining up 'welding neck' type flanges for butt welding to pipes.

In using the twinner pipe flanging jig the flange is pushed over the pipe. The jig is inserted into the pipe, and by turning the tommy bar the links are expanded to press against the inside wall of the pipe. As the links are always parallel in any position this ensures the clamping plate being square to the pipe.

The flange is secured by two bolts to the clamping plate and tack welded on



Twinner pipe flanging jig.

the outside. The jig is now removed, the internal weld completely made, followed by the external weld. We are informed that no skill is required in using the device and that the procedure has been found satisfactory after many tests.

When used for welding neck flanges the flanges are pushed over the links of the jig and the jig is inserted in the pipe and expanded. Lining-up of the two components is automatic and a gap can be left to suit welding requirements. The complete weld can be made with the jig in position.

The twinner pipe flanging jigs are of all-steel construction and are manufactured in five sizes to suit pipes ranging from 2 in. to 18 in. bore. Fuller details can be obtained from the manufacturers, *Donald Ross and Partners, Ltd., 1-3, Arlington Road, N.W.1.*

TRADE PUBLICATIONS

An information sheet describing a system of burning coke breeze which can without difficulty be applied to existing steam raising plants has been published by *John Thompson Water Tube Boilers, Ltd., Wolverhampton.* The leaflet and further details may be obtained direct from the firm.

We thank *G. A. Harvey & Co. (London), Ltd., Greenwich Metal Works, S.E.7,* for the April issue of the firm's House Magazine.

We have received from *Joshua Heap & Co., Ltd., Oldham Road Engineers' Tool Works, Ashton-under-Lyne,* a copy of an interesting illustrated folder on 'Threading Machines.' The folder describes the wide range of the firm's products in this sphere.

A comprehensive publication on the engineering properties of spheroidal graphite cast iron, issued by the *Mond Nickel Co., Ltd., Sunderland House, Curzon Street, London, W.1,* helps to establish the position of this material relative to other cast ferrous materials. The publication states that the tensile strength of spheroidal graphite cast iron is about double that of a high-duty flake graphite iron, with a distinct yield point markedly higher than that of malleable cast iron. Elongation is 1%-5% in the as-cast condition and 10%-25% in the annealed condition; and the elastic modulus, at 25 mill. lb. per sq. in. approaches that of steel. This combination of high yield strength, high modulus, and good elongation together signify that, although spheroidal graphite iron has sufficient ductility to permit twisting and bending, it is nevertheless stiff and rigid and requires considerable force to cause permanent deformation.

The publication includes a list of typical applications and a bibliography. Copies can be obtained free of charge from the Mond Nickel Co., Ltd.

J. BROWN & CO. LTD.
SAVILE TOWN, DEWSBURY, YORKS.
Supply:–
"BROWNOX-de-LUXE" PURIFYING MATERIAL
Purchase:–
SPENT OXIDE

COMPRESSORS & EXHAUSTERS FOR AIR AND GAS.
See our Advertisement Next Week.
REAVELL & CO. LTD. IPSWICH.

WELDING
GUNNING
SPRAYING
OF GAS RETORTS

EB

Write for particulars of how E. B. Service can help in reducing maintenance costs. Manufacturers of all types of Cements.

E. B. REFRACTORY CEMENT CO. LTD.
Oakfield Offices, Brettell Lane, Stourbridge

COAL AND COKE SCREENING & SIZING PLANTS.
RETORT SETTINGS PRODUCERS, FURNACES REPAIRS.

GOODALL, CLAYTON & Co. LTD.
LEEDS.

CONVEYORS, ELEVATORS, BUNKERS, ROOFS, HOISTS, Etc.

GAS RETORTS
HARRIS & PEARSON
STOURBRIDGE ENGLAND LTD
INSULATING BRICKS, RECUPERATOR TUBES, SPECIAL SEMI-SILICA QUALITY FOR SEGMENTAL RETORTS WITH NO EXPANSION OR CONTRACTION AT 1400° C
Manufacturers of
Fire Bricks, Lumps & Tiles
OF EVERY DESCRIPTION

WALTER KING SERVICES — 1
DOMESTIC UTILISATION OF GAS
by
Norman S. Smith and R. N. LeFevre
PRICE 20/-
(including postage)
FROM
WALTER KING, LTD. 11, BOLT COURT, FLEET STREET, LONDON, E.C.4

PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates: Home and Empire:—52/- per annum; Foreign:—60/- per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words)—minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep × 7" wide; block screen 120.

BUSINESS MANAGER : S. T. CULLEN

MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. *'Phone:* Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. *Telegrams:* Gasking, Fleet, London.

OXIDE

DUTCH AND DANISH BOG ORE
SPECIALLY ACTIVATED OXIDE OF IRON

Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide.

Send your enquiries to

GAS PURIFICATION & CHEMICAL COMPANY LIMITED

ESTABLISHED 1873

PALMERSTON HOUSE, OLD BROAD STREET, LONDON, E.C.2.

Telegrams: "Purification, Stock, London." Telephone: London Wall 5077

FIRE!

OUR WORKS LOST BUT FOR

NU-SWIFT!

"It seemed incredible... flames shot up everywhere... but we recharged each Nu-Swift six times and saved our factory... please send us 108 replacement charges."

NU-SWIFT LTD · ELLAND · YORKS

In Every Ship of the Royal Navy

"KLEENOFF" *

THE COOKER CLEANER

"KLEENOFF"

FIBRE BRUSHES
RUBBER MOPS

"KAY-DEE" *

KETTLE DESCALER

For resale to the public, and in bulk for Works use.

BALE & CHURCH, LTD.

7, CROMPTON WAY, CRAWLEY, SUSSEX

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is accepted from the provisions of the Notification of Vacancies Order, 1952.

ADVERTISEMENT REPRESENTATIVE required in the London Area by Walter King, Ltd., Publishers of *Gas Journal*, *Gas Service*, etc., etc. Previous experience in a Publishing House is not essential; a knowledge of the gas industry would be of advantage. Salary, commission and expenses. Write, giving full details of career, to the Managing Director, Walter King Ltd., 11, Bolt Court, Fleet St., E.C.4. All replies will be treated in strict confidence.

EAST MIDLANDS GAS BOARD

NOTTS. & DERBY DIVISION
NOTTINGHAM UNDERTAKING
ASSISTANT DISTRIBUTION ENGINEER

APPLICATIONS are invited for the post of Assistant Distribution Engineer to the Nottingham Undertaking.

The successful applicant will be responsible to the Distribution Engineer and should have had wide experience in all branches of Distribution work, and will be required to carry out the planning of mains and services on all new housing estates and trunk mains, to co-ordinate pressure surveys, etc.

Applicants should possess the Higher Grade Certificate in Gas Engineering (Supply) of the Institution of Gas Engineers, or hold equivalent qualifications.

The post is in Grades A.P.T. VIII/IX, Provincial 'A' of the National Salary Scales, and the commencing salary will be in accordance with the qualifications and experience of the person appointed.

The successful candidate may be required to pass a medical examination and, unless subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications, endorsed " Nottingham — Assistant Distribution Engineer," stating age, education, qualifications and experience, together with the names of two referees, should be submitted to the undersigned not later than May 5, 1954.

K. L. PEARCE,
Divisional General Manager.

East Midlands Gas Board,
Notts. & Derby Division,
Friar Gate,
Derby.

EAST MIDLANDS GAS BOARD

DISTRIBUTION SUPERINTENDENT—SCUNTHORPE GROUP

APPLICATIONS are invited for the above appointment from persons having sound experience in high and low pressure distribution systems, preferably accompanied by a recognised qualification in distribution engineering. Experience in supervising mainlaying by contractors is desirable. The appointment will be made n Grade A.P.T. VII (£565/645).

The successful candidate may be required to pass a medical examination, and unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications stating age, qualifications, full details of present position and past experience, and the names of two referees should be sent to the Group Manager, East Midlands Gas Board, Dawes Lane, Scunthorpe, to arrive not later than May 14, 1954.

B. CLARKE,
Divisional General Manager.

Lincoln

NORTH THAMES GAS BOARD

THE following DRAWING OFFICE STAFF is required by the Board :

Chief Engineer's Department, Westminster, S.W.1.

(i) ELECTRICAL ENGINEER DESIGNER experienced in the preparation of schemes and contract specifications for small capacity generating plants, high and low tension switchgear, lighting installations, etc. Candidates should be corporate members of the Institution of Electrical Engineers, or hold an equivalent qualification, and be prepared to take charge of the appropriate Drawing Office Section. Starting salary £850-£950 per annum.

(ii) HEATING AND VENTILATING ASSISTANT experienced in the preparation of schemes and contract specifications for heating and ventilating installations associated with the service and administrative buildings on gas works. Candidates should preferably be corporate members of the Institution of Heating and Ventilating Engineers or hold an equivalent qualification. Starting salary £720-£820 per annum.

(iii) SENIOR DRAUGHTSMEN—two vacancies each class.
- (*a*) Design and detailing of reinforced concrete structures and general engineering work.
- (*b*) Design and layout of general process plant and all associated structural steelwork.
- (*c*) Design of materials handling plant and the detailing of associated steelwork.

Candidates should preferably be corporate members of the Institution of Civil, Structural or Mechanical Engineers. Starting salary £720-£870 per annum.

Chemical Products Works, Beckton, E.6.

(iv) ELECTRICAL DRAUGHTSMAN. Candidates should be aged 25-30, with the Ordinary National Certificate and have had general Drawing Office experience. A sound background of industrial electrical services, plant and records is essential. Starting salary within the range £550-£650.

Starting salaries will be paid according to age, qualifications and experience and the successful candidates will be required to join the Staff Pension Scheme.

Applications, giving age and full particulars, must state which position is being applied for, and should be sent to the Staff Controller, North Thames Gas Board, 30, Kensington Church Street, W.8, quoting reference 666/140.

(*Classified Advertisements continued on page* 250)

APPOINTMENTS VACANT (ctd.)

LONG established and well known firm of pipe-laying contractors invite applications for the positions of an AGENT, ENGINEER/SUB-AGENT, AND QUANTITY SURVEYOR to supervise contracts in the United Kingdom. Applicants should be prepared to travel and, in the first place, write giving details of their experience. Permanent employment and superannuation scheme for the right type of men. Apply: No. 192, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

NORTH WESTERN GAS BOARD

HEAD OFFICE, MANCHESTER

FUEL TECHNOLOGIST

APPLICATIONS are invited for the above pensionable position at a salary not less than £1,350 per annum.

Candidates should hold recognised qualifications in fuel technology, chemistry and/or engineering and should have had practical experience of the utilisation of all types of fuel.

The duties will be concerned mainly with the technical aspect of the development of the commercial and industrial solid smokeless fuels markets and with the provision of technical help and advice to existing and potential consumers and to the Board's own salesmen.

Detailed applications, giving the names of two referees, should reach the Secretary, North Western Gas Board, Bridgewater House, 60, Whitworth Street, Manchester 1, within fourteen days.

NORTH WESTERN GAS BOARD

FYLDE GROUP

INSTALLATIONS OFFICER

APPLICATIONS are invited for the above pensionable appointment at a salary within Grade A.P.T. XI (£715-£840 per annum).

The successful applicant will be responsible under the Group Sales and Service Officer for the organisation and control of Fittings and Maintenance Staffs and workshop personnel and the supervisory personnel engaged upon the installation of appliances and meters.

Candidates should hold a qualification in Gas Engineering (Supply) and/or in Gas Fitting and have had good experience in the duties required.

Detailed applications, giving the names of two referees, should reach the General Manager, North Western Gas Board (Fylde Group), Princess Street, Blackpool, within fourteen days.

NORTH EASTERN GAS BOARD

LEEDS GROUP

GROUP GASHOLDER AND

STRUCTURAL SUPERVISOR

APPLICATIONS for this position are invited from candidates who should be able to supervise repairs, maintenance and painting of Gasholders and large steel structures.

The commencing salary will be in accordance with Grade A.P.T. VIII (Provincial 'A') (£605-£685 per annum) of the scales agreed by the National Joint Council for Gas Staffs.

The successful candidate will be required to pass a medical examination and participate in the Board's Staff Pension Scheme.

Applications stating age, qualifications and experience, should be forwarded to the Group General Manager, North Eastern Gas Board, Leeds Group, Sweet Street West, Leeds, 11, to arrive not later than May 10, 1954.

J. C. GARDNER,
Secretary.

Bridge Street,
Leeds, 2.
April 23, 1954.

SOUTHERN GAS BOARD

CHIEF ACCOUNTANT

APPLICATIONS are invited from accountants with wide experience for the position of CHIEF ACCOUNTANT to the Board at a commencing salary in the region of £2,500 per annum according to qualifications and experience.

In addition to being responsible for the preparation of the Final Accounts and Balance Sheet to be submitted to the Minister of Fuel and Power, the person appointed will be expected to advise the Board on financial matters and to supervise and extend the existing systems of budgetary control and standard costing at present operating in part of the Board's Area.

The successful candidate will be required to pass a medical examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme.

Applications stating age, education, qualifications, training, experience and present salary, together with a one-page summary of these particulars, should be sent in an envelope marked "Chief Accountant" to the Secretary, Southern Gas Board, 164, Above Bar, Southampton, to reach him not later than May 15, 1954.

SOUTHERN GAS BOARD

GROUP MANAGER

NORTHERN GROUP,

CENTRAL DIVISION

APPLICATIONS are invited from qualified persons with wide experience in the gas industry for the position of MANAGER of the Northern Group of the Board's Central Division at a commencing salary in the region of £1,750 per annum subject to qualifications and experience.

The successful candidate will be required to pass a medical examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme.

Applications stating age, education, qualifications, training, experience and present salary, together with a one-page summary of these particulars and the names and addresses of two referees, should be sent in an envelope marked "Group Manager" to the Secretary, Southern Gas Board, 164, Above Bar, Southampton, to reach him not later than May 22, 1954.

SCOTTISH GAS BOARD

GLASGOW DIVISION

VALE OF LEVEN DISTRICT

ASSISTANT MANAGER

APPLICATIONS are invited for the position of ASSISTANT MANAGER of the above Undertaking.

Candidates should possess the Higher Grade Certificate (Manufacture) of the Institution of Gas Engineers and have practical experience of Vertical Retorts, and the control of works plant generally.

The Salary for the post will be within Grades A.P.T. V/VI (£480 to £590) per annum, of the National Salary Scales, with placing according to experience and qualifications, plus free house, coal and gas.

Applications, stating age, training, qualifications and experience, and giving the names of two referees, should be addressed to the undersigned within fourteen days of the appearance of this advertisement.

T. A. ROWAN,
District Manager.

57, North Street,
Alexandria,
Dumbartonshire.

SCOTTISH GAS BOARD

KILMARNOCK GROUP

AUCHINLECK DISTRICT

APPOINTMENT OF

DISTRICT MANAGER

APPLICATIONS are invited from suitably qualified persons for the post of DISTRICT MANAGER of the Auchinleck District Gas Undertaking.

Applicants must be experienced in the Administration and supervision of a gas undertaking and have a sound practical knowledge of horizontal retorts, distribution practice and general office routine.

The salary will be within Scale A.P.T. VI, Provincial 'B' (£495-£575) with placing according to qualifications and experience, plus free house, coal and gas.

The post is superannuable and the successful candidate may be required to undergo a medical examination

Applications, stating age, qualifications and experience together with the names of two referees, should be addressed to the undersigned within fourteen days from the appearance of this notice.

ROBERT FIFE,
Group Manager.

Riverbank Gas Works,
Kilmarnock.
April 21, 1954.

WALES GAS BOARD

NEWTOWN UNDERTAKING

WORKING FOREMAN

APPLICATIONS are invited for the position of WORKING FOREMAN with the above Undertaking. Candidates should have experience and ability in the carbonisation of coal in horizontal retorts and full knowledge of all Gas Works Plant and equipment. A knowledge of gas distribution will be an advantage.

The appointment will be made within the Intermediate Grades Agreement, Grade VIIIB (£495/540 per annum), Conditions 1. A house is available at a reasonable rent.

The successful applicant will be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be received by Mr. H. Evans, Engineer and Manager, Wales Gas Board Newtown Undertaking, Newtown, Montgomeryshire, not later than fourteen days following the appearance of this advertisement.

CONTRACTS OPEN

WALES GAS BOARD

SWANSEA GROUP

PAINTING OF GASHOLDERS

THE COMMITTEE of the Swansea Group of Undertakings of the Wales Gas Board invite from appropriate Contractors TENDERS for the PAINTING of GASHOLDERS at Gas Works within the Group, also Tenders for the Supply and Delivery of the necessary Paint.

Applications for copies of Specifications, and for particulars of Gasholders to be painted should be forwarded to the undersigned, and Tenders for this work should be received not later than May 22, 1954.

D. W. REES, M.B.E.,
M.Inst.Gas E.,
Convener,
Swansea Group Committee.

Gas Offices,
Murray Street,
Llanelly.
April 15, 1954.

SCRAP GAS METERS WANTED!
A SPEEDY SERVICE
Sell to those best suited to deal with them.
TOP PRICES PAID
Collection arranged from anywhere in U.K. Truck Loads to our own private siding, Beddington Lane, Southern Region.
Sell to MITCHAM SMELTERS LTD
ROMETAL WORKS, RED HOUSE ROAD, MITCHAM ROAD, CROYDON SURREY
TELEPHONE THOrnton Heath 6101 PRIVATE BRANCH EXCHANGE

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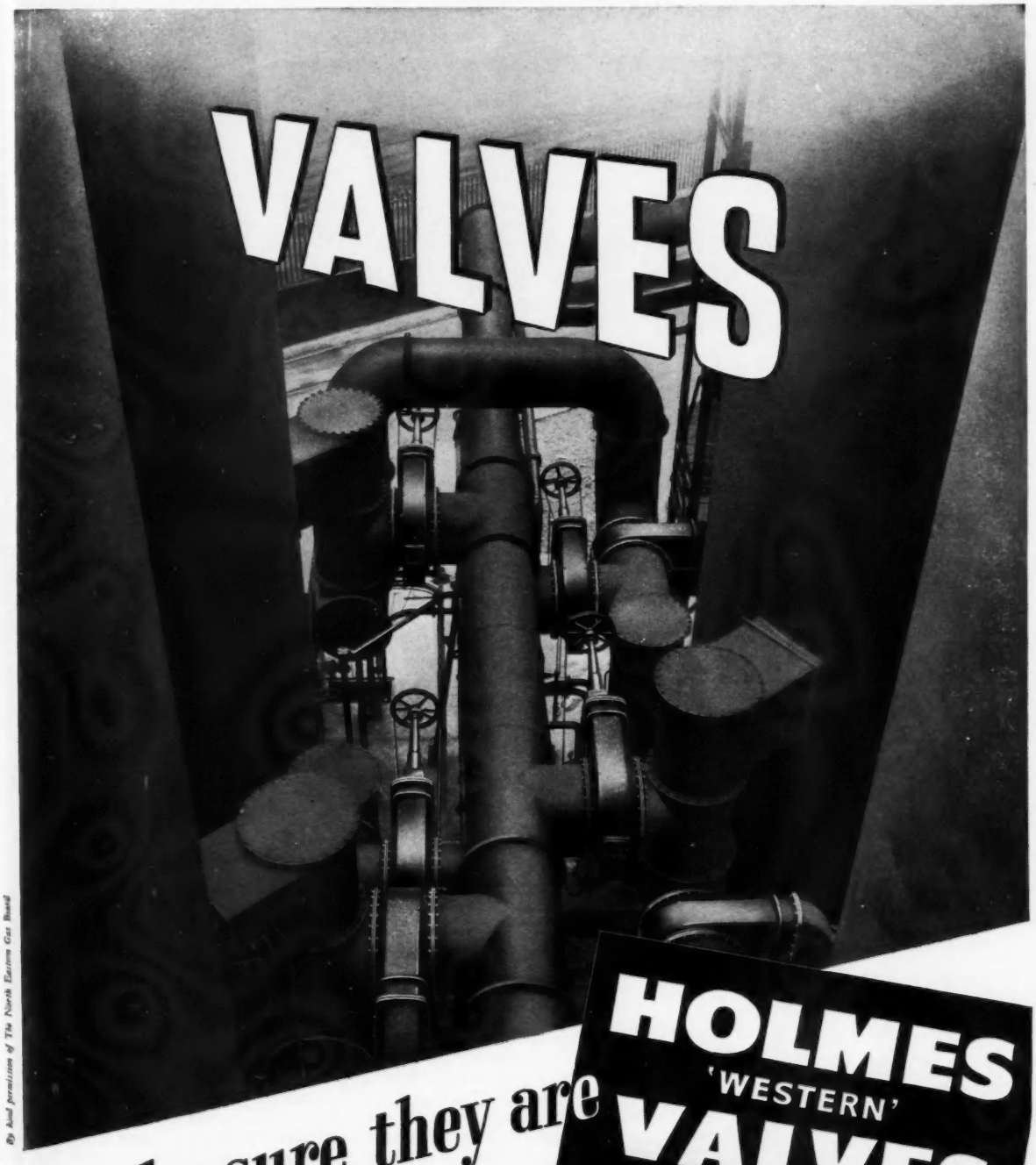

make sure they are HOLMES 'WESTERN' VALVES

Some of the 42″ rising spindle
Western Valves used for changing over Towers on the
Purifier Plant at the new Tingley Works

W. C. HOLMES & CO. LTD.

HUDDERSFIELD · LONDON · BIRMINGHAM

FOUNDED 1850 HOLMES HUDDERSFIELD

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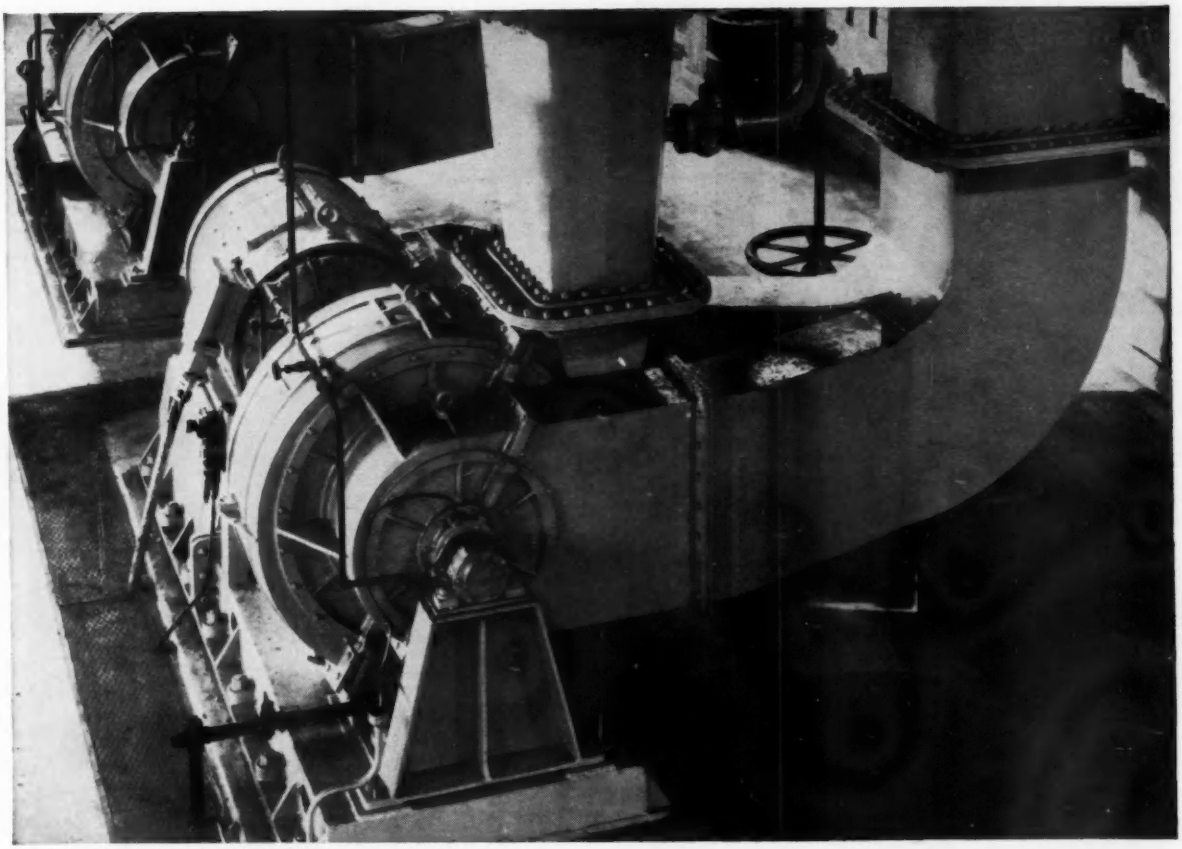


Illustrations by courtesy of the South Eastern Gas Board and Messrs. Humphreys & Glasgow Ltd.

Gas Boosting *

Part of an installation at the East Greenwich Gas Works for the supply of South London's gas are the "TORNADO" gas boosters illustrated above. Each is capable of shifting over a million cubic feet of producer gas an hour, and each was supplied with cast iron gas tight casings with detachable segments for easy servicing, stainless steel impeller and shaft, self aligning roller bearings and flexible couplings. One of the boosters was arranged for motor drive and the other for steam turbine.

FAN ENGINEERING AND INDUSTRIAL GAS EQUIPMENT

We are manufacturing gas boosters which cover a range of from 5,000 to 1,500,000 cubic feet per hour, and if you are concerned with the movement of air or gas, ask us to send you Publication No. 5/7, a survey of the standard range of "TORNADO" high pressure blowing and exhausting fans.

* **LARGE ILLUSTRATION:** *42" type 9 double width double inlet gas boosters.*
DUTY: 1,095,000 cu. ft. per hour producer gas at 104°F. saturated, giving 28" w.g. differential over inlet and outlet connections taking 138 H.P.

SMALL ILLUSTRATION: *40" type 15 air blowers.*

DUTY:	Closed outlet	Delivery
Air quantity	nil	12830 c.f.m.
Speed r.p.m.	1480	1475
Static pressure	15.8" w.g.	13" w.g.
Power absorbed	13 B.H.P.	39 B.H.P.

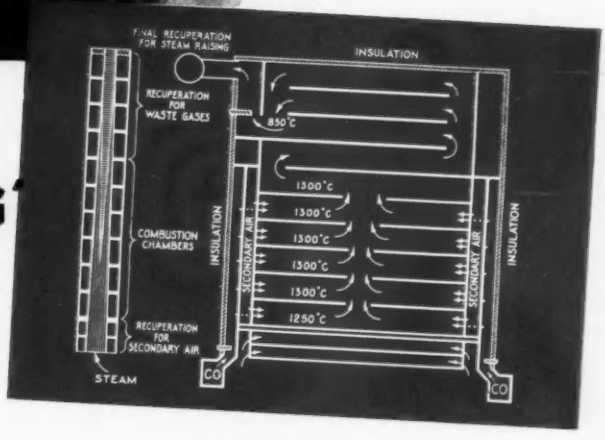
Keith Blackman LIMITED

MILL MEAD ROAD, TOTTENHAM, LONDON, N.17

'Phone: Tottenham 4522 (twelve lines). 'Grams: "Keithblac, Norphone, London."

I×8434

Registered as a Newspaper. Printed by STRAKER BROTHERS LTD., E.C.2 for WALTER KING LIMITED, 11, BOLT COURT, FLEET ST., LONDON, E.C.4. Wednesday, April 28, 1954



'BALANCED HEATING' saves fuel

"Balanced Heating", a feature of the Glover-West continuous vertical system of carbonization, reduces fuel consumption to a level hitherto unobtainable. In the "Balanced Heated" setting, producer gas enters the combustion chambers from *both* sides and retorts are evenly heated by *primary* combustion. Combustion proceeds towards the centre of the setting, heat transmitted to the outer walls being recovered in the producer gas and air uptakes and returned to the system. Control of temperature in individual combustion chambers gives greater flexibility—an important factor today when many different coals are handled by one plant.

★*Illustration shows a "Balanced Heated" setting under construction*

West's Gas IMPROVEMENT CO. LTD.

ALBION IRONWORKS · MILES PLATTING · MANCHESTER 10

Telephone: COLlyhurst 2961. Telegrams: Stoker, Manchester.

London Office: Columbia House, Aldwych, W.C.2. Phone: HOLborn 4108-9 Grams: Wesgasco, Estrand.

Can you doubt the impact

of these advertisements in 115,784,726 newspapers?

These are but two of the 1954 series of advertisements that will help to sell Ascot gas water heaters and to build a desirable gas load.

They will appear in 115,784,726 copies of 129 metropolitan and provincial newspapers.

That's how ASCOT expands its business and fortifies the gas industry.

ASCOT

Yours for 1/10 a week
fixed to adjacent gas and water points
Only an instantaneous gas water heater will give you an endless stream of piping hot water the instant the tap is turned on. An Ascot never runs cold however much you draw—yet it is economical as the burners only light up while hot water is actually flowing.
TYPE 503/2 SINK HEATER (as illustrated). Supplied on h.p. terms of 1/10d. a week (Tax paid and including fixing to adjacent gas and water supplies) by The North Thames Gas Board. Other types also on favourable h.p. terms.
There's an Ascot for every domestic purpose. Select yours at your local gas showrooms, builders' merchants or stores.
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Endless hot water
An ASCOT sink heater will give you an endless stream of piping hot water instantly. Ascot lightens the load. And here's why:—
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ASCOTS ARE SO RELIABLE—they're made in the world's largest instantaneous gas water heater factory.
ASCOTS ARE MISERS WITH GAS—the burners only light up when water is actually flowing.
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